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AN EXAMINATION OF READING OUTCOMES FOR CHILDREN IN THE SOUTHERN SCHOOL DISTRICT EARLY CHILDHOOD PROGRAM

A DISSERTATION APPROVED FOR THE DEPARTMENT OF EDUCATIONAL LEADERSHIP AND POLICY STUDIES

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"A ship is always safe at the shore- but that is not what it was built for."- Albert Einstein

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Table of Contents

List of Tables

List of Figures

Abstract

AN EXAMINATION OF READING OUTCOMES FOR CHILDREN IN THE SOUTHERN SCHOOL DISTRICT EARLY CHILDHOOD PROGRAM

The purpose of this study was to determine if the Southern District's pre-kindergarten achieved the desired reading achievement outcomes. The specific focus was on the reading development of all students attending pre-kindergarten in the Southern School District and their third-grade reading proficiency according to the Oklahoma Core Curriculum Reading Test. The Southern School District provided administrative data for the study. The District provided 729 complete cases of student reading proficiency levels from first grade first quarter through the third-grade fourth quarter, as well as categorical scores for the Oklahoma Core Curriculum Reading Test.

Findings suggest there were no differences in reading achievement between students in the Southern School District pre-kindergarten program and students not enrolled. The descriptive data revealed very similar achievement trends when comparing all District pre-kindergarten attendees to non-attending peers. The breakdown of students by proficiency performance category was nearly identical when comparing pre-kindergarten attendees to non-attendees. The cross-tabulation supported the original descriptive findings with nearly identical findings for District pre-kindergarten attendees and those who did not attend. A logistical regression analysis was conducted to determine if District pre-kindergarten had increased student odds of scoring proficient on the third grade OCCT. The model confirmed the two previous findings with the District pre-kindergarten attendance have no greater odds of scoring proficient than students who did not attend pre-kindergarten in the District.

AN EXAMINATION OF READING OUTCOMES FOR CHILDREN IN THE SOUTHERN SCHOOL DISTRICT EARLY CHILDHOOD PROGRAM

Chapter 1: Introduction

Watching American news or speaking to a friend with school-aged children can cause concern about the current educational landscape and its prospects for the nation's children. Whereas a high school diploma positively affects the nation's economy, each of the 6.2 million student dropouts in 2007 cost society over a quarter of a million dollars in lost earnings, tax revenue, and productivity (Smeeding, 2011). This dropout rate can be partly attributed to student loss of interest in middle school and is often triggered or compounded by a general academic struggle (Hoffer, 2016). Unfortunately, the conditions that lead to dropping out of high school begin before children ever attend school (Gorey, 2001).

Academic struggles and dropout rates are magnified when explicitly looking at the 15.5 million children who grow up living in poverty (Census, 2009). Researchers with the Annie E. Casey Foundation suggest that children who live in poverty and read below grade level in the 3rd grade are three times less likely to graduate from high school as students who have never been economically poor (Hernandez, 2011). Additionally, the *U.S. Department of Education's 2011 Condition of Education Report* found that 68% of high poverty school students graduate, compared to 91% of students in more affluent schools ("The Condition of Education," 2011). Variance in achievement linked to family income is not a new issue. The 1966 *Coleman Report* revealed disheartening data showing that student performance is largely unequal, and deprived academic skills affects adulthood opportunities (Coleman, 1966; Coleman, 1972).

Coleman identified and continued to study gaps in achievement and found significant differences based on children's race and familial income with white children scoring higher than other races and poor children scoring lower than their more affluent peers (Coleman, 1966; Coleman, 1972). The difference in outcomes between students of different ethnic, economic, and other characteristics was termed an *achievement gap* (Achievement Gap, 2011; Garcia, 2015; Reardon & Galindo, 2009). Coleman's results led educators to study the data further to find the source of these discrepancies (Coleman, 1972). This task became complex as research revealed that achievement discrepancies intertwine with the complexities of child development.

Language acquisition and early literacy are two cognitive factors shown to be affected by adverse conditions associated with poverty (Burchinal & Cryer, 2003). Children at early childhood ages are developing their early literacy and language skills, which can determine if they experience academic success or struggle in school (Burchinal & Cryer, 2003). According to a study on language development, by age three, children in poverty have smaller vocabularies and lower language skills than children of the same age from middle-income families (Hart & Risley, 2003). As children with low-level language skills progress through school, they tend to struggle to keep up with their peers and have dropout rates much higher than average students (Hart & Risley, 2003).

Fifty years after the Coleman report, persistent achievement gaps have led many educators and policymakers to search for strategies that can prevent achievement gaps from occurring in the first place (Reardon, 2013). Early childhood education has become one viable policy solution to address the problem (Duncan & Magnuson, 2013). Early intervention, in various forms of early childhood education, has been shown to be positive for student academic ability (Barnett, 1993; Barnett et al., 2008; Burchinal & Cryer, 2003; Gilliam & Ripple, 2004). A

common mechanism to prepare children for success in early childhood education years is pre-kindergarten. In 2013, The National Governors Association spoke about the importance of early childhood education. The speaker declared, “Starting at kindergarten is too late. Language and literacy development begins at birth, and gaps in achievement appear well before kindergarten entry. High-quality early learning experiences can help close the gap” (Markell, 2003). Investments in early childhood education also have an extraordinary rate of return with authors claiming society can expect educational outcomes to produce an $8.24 return for each dollar invested in the first four to six years of school, including pre-kindergarten. ("Early Warning! Why Reading by the End of Third Grade Matters", 2010). As school systems make these investments, it has been found that early childhood programs of high-quality can result in lasting effects on student academic growth in areas such as social and emotional awareness, mathematical reasoning, and language development (Barnett, 1993; Barnett et al., 2008; Burchinal & Cryer, 2003). Simply increasing access is not enough. Early learning experiences need to ready students for school in order to ensure all students make expected progress (Barnett, 1993; Barnett et al., 2008; Burchinal & Cryer, 2003; Gilliam & Ripple, 2004; Pianta et al., 2009).

The lack of early literacy and language skills can lead to struggles to learn vocabulary and other language skills at the same rate as more developed peers (Hart & Risely, 2003). To keep pace with their peers, students must have mastered foundational literacy skills needed to succeed in all other subject areas by the third grade. Many students, though, do not develop requisite literacy skills by the time they enter elementary school (Garcia, 2015). Not achieving mastery of their foundational literacy, especially for low performing groups of students, can have life-long consequences such as students being less likely to be engaged in middle school and

later, less likely to graduate high school, with studies finding this group's dropout rate higher than average (Gorey, 2001; Hoffer, 2016).

Often hidden in conversations on the benefits of early learning experiences is the importance of program quality (Downey & Condron, 2016; Duncan & Magnuson, 2013; Gilliam & Ripple, 2004; Gilliam & Zigler, 2001; Gormley & Phillips, 2005; Hiebert & Taylor, 1994; Hill, Gormley & Adelstein, 2015). As expected, high-quality programs consistently produce positive results for the preparedness of students for elementary school (Downey & Condron, 2016; Duncan & Magnuson, 2013; Gilliam & Ripple, 2004; Gilliam & Zigler, 2001; Gormley & Phillips, 2005; Hiebert & Taylor, 1994; Hill, Gormley & Adelstein, 2015). Specifically, students who experience a high-quality early childhood program show gains in reading achievement, mathematical reasoning, and social development (Gormley and Phillips, 2005; Pianta et al., 2009; Reardon, 2013).

Evidence at the national, state, and local levels make a strong case for investments in early childhood development as a means to prepare all students, regardless of family background, for successful school experiences (Downey & Condron, 2016; Duncan & Magnuson, 2013; Gilliam & Ripple, 2004; Gilliam & Zigler, 2001; Gormley & Phillips, 2005; Hiebert & Taylor, 1994; Hill, Gormley & Adelstein, 2015). On average, children exposed to quality early learning fare better in literacy development than children without such experiences (Gormley and Phillips, 2005; Pianta et al., 2009; Reardon, 2013). Averages, however, can mask variation in program outcomes. With this in mind, it is incumbent on local education leaders to understand if their early learning programs are achieving intended outcomes, and how and why the observed outcomes are being achieved. Thus, this research was intended to analyze

administrative and academic data from the Southern School District to report on the literacy development of students attending its pre-kindergarten program.

Problem Statement

Consistently, national data support the benefits of a high quality early learning experience for students, especially students from high poverty backgrounds (Camilli et al., 2010; Campbell et al., 2001; Garcia, 2015; Gormley and Phillips, 2005; Jensen, 2009; Magnuson et al., 2003; Reardon and Portilla, 2016). National evidence should not be interpreted to mean that local programs produce similar results. It is incumbent on district leaders to understand if investments in early learning experiences are preparing children to reach expected literacy standards.

For this study, the Southern School District has invested in its early childhood program for over ten years. The district has grown the program to include income eligible three-year-olds, all four-year-olds, and all five-year-olds. Whereas the district has reviewed reading and language acquisition data for reporting purposes, the focus has not been on the reading achievement trends for participants in the program. Currently, there is not an annual comparison of early literacy outcomes for students attending pre-kindergarten to other students not enrolled in the district pre-kindergarten. Without this evidence, educators are left in the dark to understand if the early learning experience is producing the early literacy results it is expected to achieve.

Purpose of the Study

The purpose of this study was to determine if the desired reading achievement outcomes of Southern District's pre-kindergarten were realized for a cohort of students entering pre-kindergarten in 2010 and ending third grade in 2015. The specific focus was on the reading

development of students attending pre-kindergarten in the Southern School District and their third-grade reading proficiency according to the Oklahoma Core Curriculum Reading Test. The questions guiding this study were:

1. What were the trends in reading achievement for students who attended pre-kindergarten in the Southern School District compared to those children who did not attend pre-kindergarten?
    a. What were the trends for Free and Reduced Lunch students?
    b. What were the trends for Limited English Proficient students?
2. Was there a difference in reading proficiency scores in first grade and third grade between students who attended pre-kindergarten in the Southern School District compared to those children who did not attend pre-kindergarten?
    a. What were the differences for Free and Reduced Lunch students?
    b. What were the differences for Limited English Proficient students?
3. What was the relationship between pre-kindergarten attendance in the Southern School District and third-grade reading proficiency as measured by the Oklahoma Core Curriculum Reading Test?
    a. What was the relationship for Free and Reduced Lunch students?
    b. What was the relationship for Limited English Proficient students?

Definition of Terms

The following definitions are provided to assist in interpretation and explain terms used in this study.

Pre-kindergarten Attendance. The student was enrolled in and regularly attended pre-kindergarten as a four-year-old student in the Southern School District.

Non-attending Students. The student was not enrolled in pre-kindergarten as a four-year-old in the Southern School District. Non-attendance did not preclude the student from attending another four-year-old program.

Free and Reduced Lunch Status. The student's familial income qualified them for a free or reduced lunch rate as determined by the National School Lunch Program. Free and Reduced Lunch status was commonly used in educational publications as an indicator of familial poverty.

Limited English Proficient Status. The student was assessed as needing English language support. The Southern School District offers Limited English Proficient Students a variety of language instruction educational programs. The programs were designed to assist students in learning English and meet age-appropriate academic achievement standards for grade promotion and graduation. Structured English Immersion is the model used at the early childhood and elementary levels.

National Institute for Early Education Research (NIEER) Quality Standards. NIEER publishes state Quality Standards assessments for each state in the annual NIEER Yearbook. These assessments measure access, structural qualities, and financial resources provided by the state.

Reading Proficiency. The student was measured to have a reading ability at or above the assessment's cut score between proficient and non-proficient. This score changes as the child's grade level increases.

Organization of the Dissertation

The dissertation is divided into six chapters. Chapter 1 includes the introduction, problem statement, purpose of the study, definition of terms and this organization of the dissertation. Chapter 2 reviews the literature and research on the background of early childhood education, the income achievement gap, major early childhood education studies and preschool as a mediating condition to low academic performance. Chapter 3 describes early childhood education quality standards. This includes the characteristics of high-quality preschool, an overview of the NIEER standards and a description of the Early Childhood Initiative of the Southern School District. Chapter 4 describes the design, data source, reading assessments and analysis of the study, as well as, potential threats to validity. Chapter 5 contains the results of the descriptive statistics, cross-tabulation analysis, and logistical regression findings of the study related to the research questions. The final chapter provides a summary of the findings as well as recommendations for the Southern School District and further research.

Chapter 2: Review of Literature

This review of literature makes a case for early childhood education as a mechanism for substantial early literacy development. It does so by describing the role and effect of poverty on a child's education experience, followed by evidence on the income achievement gap. Next, the review synthesizes evidence on the effects of early childhood education. The review concludes with evidence of preschool as a mediating condition between the effects of poverty and academic performance.

The Effect of Poverty on Child Academic Performance

Studies show that children living in poverty come to the first day of school with fewer and less proficient skills than their more affluent peers (Duncan & Magnuson, 2013). Hart and Risley (2003) found that children may exhibit lower academic performance, in part, due to living in homes with income at or near the poverty line. In the 2003 study, children living in homes at or near the poverty line were spoken to less by their parents than their higher-income peers, resulting in lower vocabulary and language development (Hart & Risley, 2003). Neurological studies also indicate that children living in poverty demonstrated brain function lower than their higher-income peers (Jensen, 2009). By living in settings where they are spoken to less, have lower vocabulary, have lower language development, and have lower brain function, children living in poverty are less academically prepared to succeed in their early childhood years at school (Hart & Risley, 2003; Jensen, 2009).

Continuing with this evidence, from 2007 to 2012, Child Trend's Data Bank compared the scores of children living below the poverty line, ages 3-6 years old, against their peers living 35% above the poverty line, in tests regularly administered as hallmarks of early childhood academic skills. The tests included visually identifying the alphabet, verbally counting to 20,

and writing their names. Twenty-one percent of the lower income children were able to recognize the alphabet, while 35% of their higher-income peers were able to do this successfully. This represents a 14% difference in alpha recognition. In the same study, 49% of lower income children could count aloud to 20, while 67% of their higher-income peers could perform the same task. This represents an 18% difference in numeracy verbalization. Finally, 46% of the lower income children were able to write their first name, while 64% of their higher-income peers could do likewise. This represents another 18% gap in achievement. This study showed that lower income children did not have as high a skill level in early childhood academics on average and therefore arrived to Kindergarten less ready than their more affluent peers.

Language, long-term memory, working memory, and executive control were also shown to be lower for lower-income children than their more affluent peers in Evan's (2010) study of healthy children from low and middle-income families. Shown in Figure 1, children living below the poverty line were between 3.5 and 4.0 standard deviations lower than their higher-income peers in each indicator measured (Evans et al., 2010; Farah et al., 2006). These findings were later confirmed by another study in which children performing similar exercises who had lower familial income were also less likely to possess cognitive and early literacy-readiness skills than their peers who lived above the poverty threshold ("Early School Readiness," 2015).

Reardon and Portilla's (2016) analysis of trend data from 1998 to 2010 indicates that income achievement gaps now double racial gaps. Even more alarming, Reardon (2016) found that persistent income gaps exist at a time when economic inequalities have grown 30-40% over the past 25 years. Clearly, achievement gaps attributed to poverty remain a primary problem for society, leaving many to wonder if closing the income achievement gap is possible (Reardon, 2013; Reardon & Portilla, 2016).

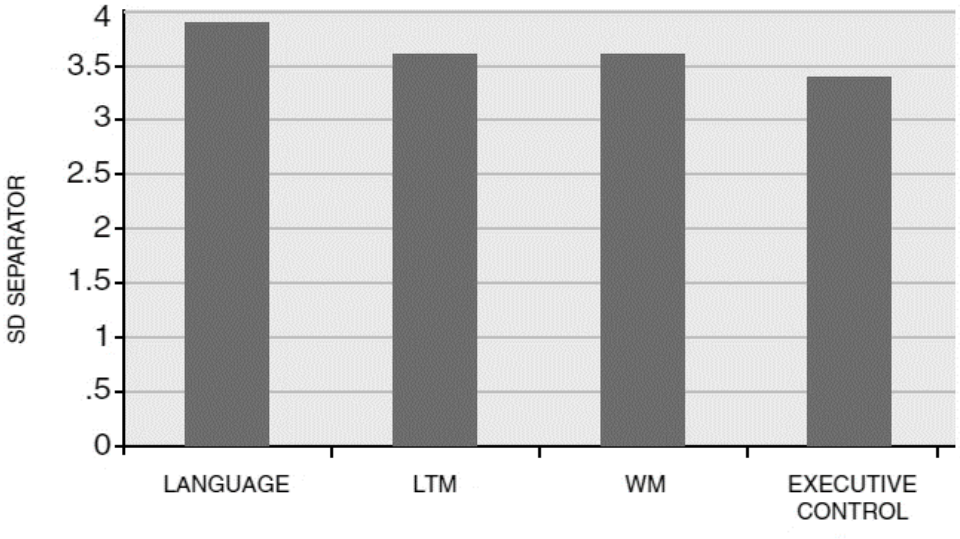

Figure 1. Effect sizes measured in standard deviations of separation between low- and middle-SES 10- to 12-year old, African American children. Adapted from Evans, G. W., Brooks-Gunn, J., & Kato Klebanov, P. (2011). Stressing Out the Poor: Chronic Physiological Stress and the Income-Achievement Gap. *Pathways,* Winter, 16-21.

Current trends for Kindergarten readiness are a positive indication that income achievement gaps can close. From 1998 to 2010, Reardon's team found that the achievement gap discrepancy, as measured by hallmarks of Kindergarten readiness, had narrowed between high- and low-income children by 10-16%. This change is surprising since the same study concluded that income inequality in the United States has continued on a growth path through the 2000s. It would be expected that the income achievement gap of children from those families would also grow. However, data showed that longitudinally, the income achievement gap, if following current trends, could cease within 60 to 110 years (Reardon & Portilla, 2016). This is a positive change in the longitudinal trend, but due to the malleability of the income achievement gap, this positive turn may not hold for the next ten decades (Reardon, 2013; Reardon & Portilla, 2016).

A change in the trajectory of the income achievement gap indicates that there are places where families, schools, and communities are succeeding in mediating the influence of poverty on a child's education (Reardon, 2013; Reardon & Portilla, 2016). So how is this happening? What intervention has been successfully implemented that could mediate the conditions of poverty? One explanation for this success is the rise of early childhood experiences provided by high-quality preschool and pre-kindergarten across the nation, which began over a hundred years ago (Jensen, 2009; Reardon, 2013; Reardon & Portilla, 2016).

Early Childhood Education: Its Growth and Effects

By 1900, Maria Montessori had begun her first preschool in Rome in which she developed her now famous methods by which children learn best by themselves in a properly prepared environment. Inspired by her and her colleagues, other educators took up the cause of early childhood education, including Patty Smith Hill of Columbia University who began a progressive laboratory nursery school used to educate teachers of young children. Today, the laboratory nursery school is known as the National Association for the Education of Young Children, which is a leader in providing guidance and consultation services of the highest quality for educators (Hyson & Tomlinson, 2014; Jensen, 2009). Another critical program, Head Start, began in 1965. Federally funding allocations for preschool education began in 1995, and child development centers became Head Start, recognized today as Early Head Start for low-income families with infants and toddlers. Researchers have shown Early Head Start can successfully educate young children and allows their families to return to work before the child being of traditional school age (Hyson & Tomlinson, 2014).

In this same time span, several major long-term studies were conducted to find the connection between early learning and later development in childhood, adolescence, and

adulthood. The two most notable studies are the Perry Preschool Study and the Abecedarian Project from the 1960s and 1970s (Campbell et al., 2001; Campbell et al., 2012; Heckman et al., 2010; Schweinhart et al., 2005). The Perry Preschool participants were 123 economically disadvantaged Black children from Ypsilanti, Michigan. They either participated in a 2-year preschool program or were part of the control group which had not attended a 2-year preschool program. Researchers tracked both groups until the subjects were age 40, making the study one of the first to follow children into adulthood with findings indicating positive results for preschool participants on adult measures (Heckman et al., 2010; Schweinhart et al., 2005). Preschool participants, also known as Perry participants, had higher achievement scores and completed more homework in adolescence than their control group peers. They touted higher graduation rates, employment rates, and higher earnings at age 40 than did the children of the control group (Schweinhart et al., 2005).

The second well-known study is the Carolina Abecedarian Project. This study analyzed a random assignment of 111 Black economically disadvantaged children from Chapel Hill, North Carolina. Children in the treatment group received high-quality care from infancy through preschool. In addition to kindergarten and early years testing, follow-ups with participants were conducted at 12, 15, 21 and 30 years of age. Results showed higher scores on reading and math achievement tests over time (Campbell et al., 2001). The participants from the treatment group were more likely to graduate from a 4-year university, have full-time jobs, but were less likely to need welfare assistance than the control group (Campbell et al., 2012). Such studies and those that reflect similar positive findings of younger aged children have led to early education being highly valued and supported by some states.

In 2014-2015 the United States grew in preschool enrollment, in early learning experience spending per child, and in quality standards over the previous school year (Barnett et al., 2016). Nationally, early learning programs such as Head Start, an early learning program that targets low-income families, also found that participants had positive results even into adulthood (Bauer & Schanzenbach, 2016). In a recent study conducted by The Hamilton Project, Head Start participants were found to have increased in participant high school graduation rate, college attendance, as well as receiving a post-secondary degree (Bauer & Schanzenbach, 2016). Separately, Georgetown University also studied the Head Start Programs in Tulsa, Oklahoma, and found positive results (Phillips et al., 2016). In Georgetown's study, researchers found that the program increased mathematics test scores, reduced the likelihood of participants being chronically absent, and reduced the number of students retained in one or more grades (Phillips et al., 2016).

Perhaps one reason the Head Start Programs and others like it have shown positive evidence is their focus on school and parental partnership (Bauer & Schazenbach, 2016; Sparks, 2011; Viadero, 2000). While school has become a family focus, studies have shown that children in poverty whose parents provide engaging learning environments at home do not start school with the same academic readiness gaps seen among poor children generally, however, children beginning school as four-year-olds is becoming a societal norm (Sparks, 2011; U.S. Department of Education, 2000; Viadero, 2000). Families are also signaling the importance of early education in other ways. The American Education Research Association presented a study from Daphne Bassok's team showing that between 1998 and 2010 families increased the amount of time they spent on educational activities to a significantly measurable level (Bassok et al., 2016). Families found themselves reading with their children, taking them to museums, and

exposing them to educational computer games far more often than was reflected in past surveys (Bassok et al., 2016). With families increasingly involved and supporting these programs, national studies have further analyzed the outcomes of other early childhood programs.

One such example is in a Michigan study. In the study, pre-kindergarten was found to raise student scores in kindergarten (Xiang & Schweinhart, 2002). Xiang and Schweinhart's study showed Kindergarten teachers rated pre-kindergarten completers higher in language, literacy, math, music, and social relations than students who did not participate in a pre-kindergarten program (Xiang & Schweinhart, 2002). The pre-kindergarten completers were also more likely to pass the Michigan Educational Assessment Program's reading and mathematics tests than non-pre-kindergarten graduates (Xiang & Schweinhart, 2002). A meta-analysis of state-funded pre-kindergarten confirmed the 2002 finding with similar results showing that programs in 13 states found statistically significant positive effects on some aspect of child development in all states and various programs (Gillam and Zigler, 2001).

In order to make these academic gains replicable for children in a number of classrooms, schools, and communities, Magnuson et al. (2003) used national data to determine what environment produced the greatest gains for children. They found that kindergarten students who had attended pre-kindergarten scored higher on reading and mathematics tests than did their parental-care peers, even when parents reported working on academic tasks with their child. Child-center participants scored between pre-kindergarten peers and parental-care peers. Pre-kindergarten students had the most substantial gains overall (Magnuson et al., 2003).

As Magnuson's team focused on the ideal environment type for the production of the greatest gains, Pianta focused a 2009 study on children's economic background and its effect on behavioral and academic growth. More economically advantaged peers grew and at a rate of .75

per year when compared to the whole growth of their less advantaged peers. While the growth rates are not equal, there is no doubt that the children of all economic backgrounds benefitted from the experience. Pianta also noted that no matter their background, children are entering pre-kindergarten with behaviors and academic skills below historically normed expectations (Pianta et al., 2009). Pianta attributed much of this discrepancy to an achievement gap that begins affecting a child from birth. In the study, Pianta also measured the abilities of children who had attended pre-kindergarten; they were shown to close the achievement gap by 25-85% upon entering kindergarten (Pianta et al., 2009). At ages 14 to 19, these children still showed effects of pre-kindergarten with an average closure of the achievement gap of 40% over peers who had not attended, meaning that their achievement gap closure, at least in part, persisted over time.

To help mediate the academic achievement gap, researchers have measured pre-kindergarten where children have been shown to benefit socially. Gormley's 2011 study of Tulsa Public Schools showed that children participating in pre-kindergarten were rated by their Kindergarten teachers as having less timidity than non-pre-kindergarten peers. They did not show any measurable change in disobedience, aggressiveness, attention seeking attributes or apathy. Children were found to be more attentive, but with only modest effect sizes of .15 for timidity and .19 for attentiveness (Gormley et al., 2011). When specifically looking at low-income students, Gormley's team indicated that there was a marginally significant reduction in timidity and a significant decrease for inattentiveness. Such reductions in negative behavior benefit a child who is instead more able to effectively function and learn in a classroom environment as expected for the age norms.

Providing early childhood programs has been a nationwide effort and has become normed both nationally in the United States. Locally, the State of Oklahoma boasts high access to pre-kindergarten for 4-year-olds (Barnett et al., 2016). In many of the studies outlined, researchers note that language, literacy and mathematical gains for young learners can be made in high-quality early childhood programs (Barnett et al., 2016; Bassok et al., 2016; Xiang & Schweinhart, 2002). With such widespread national and local participation in the early childhood program, the next step in producing the academic and social gains, found in other studies, is to ensure a high-quality program locally. The importance of the quality is so vital to the program's success that early childhood educators, researchers, and private funders have worked together to analyze and create a set of national standards of early childhood excellence (Barnett et al. 2016; Xiang & Schweinhart, 2002). By researching the effectiveness of early learning experiences at the local level, researchers and districts can determine if their programs are replicating national evidence and determine what alteration may be needed if they are not performing as expected. Unfortunately, in Oklahoma, many program decisions are made based on affordability rather than researched and measured practice, which can affect the program's potential results (Barnet et al., 2016).

Early Childhood Education in Oklahoma

On average, the United States' pre-kindergarten funding increased by $319 per child nationally; however, Oklahoma's state spending dropped $17 per child. Oklahoma ranks fourth in the nation for access to pre-kindergarten classes for 4-year-olds but meets only eight of the quality standards (Barnett et al., 2016). Oklahoma was an early pre-kindergarten supporter, beginning its program in 1980 with the intent to serve all 4-year-olds in the state. In 1990, the program finalized state funding for Head Start-eligible students and gave districts the option to

serve all students through local funds or tuition. By 1998, Oklahoma became the second state to provide free preschool for all 4-year-olds with 99% of districts providing the program (Barnett et al., 2008).

Currently, Oklahoma ranks 28th in per-pupil spending for 4-year-olds, and much lower at 46th for all student spending. The state serves 40,085 students in pre-kindergarten for 6 hours a day, five days a week. Most programs operate on a regular school academic year. Head Start funds 14,660 of the students are funded through Head Start. Some students even begin the program when they are three years old (Barnett et al., 2016).

Pre-kindergarten teachers in Oklahoma are also, by law, paid the same as kindergarten-to-third grade teachers and received the same fringe benefits. Lead teachers must have a college degree in an education-related field and have a certificate in Early Childhood Education (Gormley & Phillips, 2005). Oklahoma is one of 12 states that require pre-kindergarten teachers to have both a bachelor's degree and a teaching certificate from the 33 states surveyed (Gilliam and Ripple, 2004). At the state level, pre-kindergarten is supported by two full-time English Language Learner (ELL) specialists to provide training for pre-kindergarten staffs upon request (Gormley & Phillips, 2005). These supports are helpful both due to a high ELL population in Oklahoma public schools and because Oklahoma has no state set curriculum or pedagogical principles to guide teachers. Many teachers have created their curriculum and borrowed from standardized curriculum programs such as Creative Curriculum, Scholastic Inc.'s 4-year-old curriculum, and Curiosity Corner, to name a few (Gormley & Phillips, 2005).

Oklahoma pre-kindergarten has yielded positive results such as in the Gormley 2005 Tulsa Public Schools study. Children exposed to Tulsa pre-kindergarten, on average, scored 16% higher on the Early Childhood Skills Inventory (ECSI) than children who did not attend

pre-kindergarten in overall test scores. In this study, Hispanic children benefitted the most from Tulsa pre-kindergarten with improved ECSI scores of 54% after controlling for familial income, race and ethnicity (Gormley & Phillips, 2005). It is not unusual or unexpected for children who are bilingual to make such gains when provided a high-quality program. As for the effectiveness of a program, researchers have stated that any early intervention itself may be more important than even the language of instruction for these ELL children (August & Hakuta, 1997; Johnson, 1992). It has also been argued with evidence that early literacy instruction for ELL students coincides with effective instruction for English-dominant students (Slavin & Cheung, 2004). This is largely due to instructors spending more time focused on the diverse learning needs of their students (Kelly et al., 2008).

Pre-kindergarten is also valuable for other minority students in Tulsa. Black children's test scores improved by 17% in the Tulsa study conducted by Gormley's team. The scores were especially noteworthy for cognitive test improvement and closely followed by gains in language skill improvement (Gormley & Phillips, 2005). White children, on average, did not show a statistically significant increase; however, it was noted that during testing, many of the White children topped out their scores on the tests, which could have masked results due to a ceiling effect, an effect which skews data due to a child outperforming the test's top scores and thereby giving an artificially low score for their measurement, in the testing instrument (Gormley & Phillips, 2005).

When considering the results, a child's poverty level is often a key factor correlating with achievement (Jensen, 2009). In the Tulsa study, children not receiving free or reduced-price lunch did not show statistically significant effects (Gormley & Phillips, 2005). This could also be due to the ceiling effect mentioned above. The children who do have a low family income

and receive free or reduced-price lunch scored a 35% growth in scores. Students with the lowest family incomes and free lunch gained more than their reduced-cost lunch peers, but the difference was not calculated (Gormley & Phillips, 2005). These children benefitted greatly from pre-kindergarten as reflected in the score growth. The children receiving free lunch grew 31% in cognitive tests, 18% in language skills, and 15% in gross motor skills as a result of pre-kindergarten exposure.

Another factor in the Gormley and Phillips 2005 study examined was the hours per day children participated in the program. Some children were participating in a half-day program while others were in full-day programs. For children who received reduced-price lunch, those in a full-day program increased their test scores; however, those in the half-day program showed no skill improvement. Students in the half-day program who receive no lunch benefit benefitted academically but fared worse academically if they were involved in a full day program (Gormley & Phillips, 2005). Substantial evidence indicates that more exposure to early interventions creates the greatest benefits (Shonkoff & Phillips, 2000). Additionally, many Oklahoma pre-kindergartens are full-day programs, as is the case in the Southern District, which allows parents to work full-time jobs.

These positive effects of the Tulsa pre-kindergarten program indicate that replicated versions can lead to significant gains in cognitive, language, and gross motor skills, especially for Hispanic and Black children and children of lower socio-economic status. These findings raise numerous policy issues nationally, including the funding of said policies (Barnett et al., 2016; Gormley & Phillips, 2005).

Among policy issues raised are quality standards for early childhood programs. Most states, including Oklahoma, only regulate structural qualities of programs. Most of these

regulations are viewed within the profession as contributing to the betterment of experiences and outcomes for children (Shonkoff & Phillips, 2000). At all levels, policymakers often focus on structural qualities and neglect how funding and policy may affect process quality. Changing a class ratio limitation could change more than just the number of children in the room. It is commonly assumed that this kind of structural quality will not affect the child's outcomes and that process quality alone will determine the expected results of a program (Burchinal, Roberts et al., 2000; Howes et al., 1992; NICHD ECCRN, 2003).

This study will combine analysis of the structural quality of a program, as described in the next section, with the outcomes for children. This will allow researchers to assess both the structural integrity of the local Southern School District program, as well as, the trends in reading proficiency of the participants and a control group.

Chapter 3: Early Childhood Education Quality Standards

Although the measurement of the effect to which preschool academically benefits all students and select sub-groups of students is still a developing topic in the field of education (Magnuson et al., 2003; Pianta et al., 2009), early childhood literature largely agrees that the quality of the early childhood program directly affects the degree of positive academic and social outcomes for participants, especially in cognitive and language development measures (Cassidy et al., 2005; Health, 2000; Peisner-Feinberg et al., 2001; Pianta et al., 2009). In both the preschool setting and other early childhood settings, higher quality care produces better gains language and math scores in their early elementary years than peers who experienced low-quality care (Peisner-Feinberg et al., 2001). While research has provided extensive evidence on the positive effects of high-quality child care, the variables which create those positive effects are not easily replicated into all communities, schools, and classrooms (Cassidy et al., 2005).

Characteristics of High-Quality Preschool

To be considered a high-quality early learning environment, two major elements must be in place. First are *structural qualities* of programs such as teacher education, curriculum, and other characteristics of the classroom or program. These are typically controlled by regulation or financing and include class size, professional development of the teacher, child-teacher ratio, and other services offered to families (Howes, Phillips & Whitebrook, 1992; Vandell & Wolfe, 2000). The structural qualities are often viewed as necessary even to create the possibility of a high-quality environment but do not guarantee high-quality care and are influenced by macrosystem factors such as government regulations, district policies and economic climate (Phillipsen et al., 1997).

To guarantee a high-quality program, structural elements must be in place as well as a second element which is referred to as *process quality (*Howes, Phillips & Whitebrook, 1992; Vandell & Wolfe, 2000; Phillips & Howes, 1987*).* In an early examination of the difference between process and structural quality, structural quality was described as the composition and staff qualifications in a program while the process quality was defined as the dynamic environment that captures the child's experiences (Phillips & Howes, 1987). An example of process quality would be the way a teacher interacts with children during a lesson or how peers interact with one another (Vandell & Wolfe, 2000). Pianta furthered the definition of process quality to include both the child's direct experiences with people and also objects or activities in their care setting (Pianta et al., 2009).

There is a moderate relationship between structure and process variables (Cassidy et al., 2005). Of the structural indicators, teacher pay (.33 at $p < .001$ level) and teacher education at an associate's degree or higher (.34 at $p < .001$ level) seem to be the strongest indicators of process quality (Helburn, 1995; Howes et al. 1992; Scarr et al. 1994). These indicators outweighed other structural quality correlations in the study such as years of experience (.04), adult to child ratios (.25) and class size (.03). Researchers found that structural indicators provide the foundation for process indicators but may not have a direct influence on the process quality of care a child receives (Cassidy et al. 2005). An example of this would be children in lower student-teacher ratio classrooms would, in theory, be able to receive more interactions with their teacher in one day than a child in a classroom with more students per teacher, especially if the teacher has a higher level of education (Howes, Whitebrook & Phillips, 1992; NICHD Early Child Care Research Network, 1996, 2000a). In reality, the structure of the smaller class size may be present and conducive to higher quantity and quality interactions, but the process quality, or the

relationship and interactions of a child and their teacher, peers, and environment, could remain low due to a number of process quality experiences (Howes, Whitebrook & Phillips, 1992).

The NICHD Early Child Care Research Network also performed a large-scale study to capture the associations between structural and process quality and child outcomes. The authors found modest pathways from some structural qualities, teacher education, and class ratio, to some process qualities such as teacher sensitivity to a child. Noted, but less substantial positive associations were found with other indicators including caregiver training, child-staff ratio, and the quality of care-giving behaviors (NICHD, 2002). With relationships connecting structural quality to process quality, educators have developed state-specific and national standards to measure early childhood program quality (Cassidy et al. 2005).

NIEER Standards Overview

The National Institute for Early Education Research (NIEER) leads the field in conducting academic research to inform policy supporting high-quality early education for all young children. The organization aims to promote the physical, cognitive, and social development needed for a child to be successful both in school and later in life. NIEER provides independent, research-based analysis to educators, policymakers, journalists, and other researchers. These data are used for a variety of reasons including the improvement or creation of high-quality settings for young learners.

NIEER's four primary program aims are tied to the ability to provide a vision of excellence in early education; produce an evaluation of state and national progress toward early education excellence each year; to develop and analyze policies, legislation, and standards in regard to improved quality and increased access to preschool programs; and finally, to explain

the economic benefits of alternative policies (Barnett et al., 2016). In its work with other programs both at the state and national level and with other non-government affiliated programs, NIEER tries to work collaboratively to affect change in early education. With this purpose and set of goals in mind, NIEER has provided a national set of preschool standards for high-quality early education, recognized both as a high level of achievement for those marked as proficient and also a model of excellence that provides the framework for many districts, state, and national goals in early education.

The NIEER framework includes ten standards that measure high-quality preschool. The markings of *proficient* signify a school to be of very high quality. The State of Preschool Yearbook is an annual publication that shows the results of the organization's tracking of funding, access, and policies of state-funded preschool programs since the 2001-2002 school year. The Yearbook seeks to improve the public's knowledge and understanding of state efforts to expand the availability of high-quality education to young children in the 21st century. NIEER publishes this report as a resource for policymakers, advocates, and researchers to make more informed decisions as state-funded preschool education moves forward to another decade of progress (Barnett et al., 2016).

Nationally, during the 2014-15 school year, continued improvement was shown in state-funded pre-kindergarten both for increased enrollment and a greater number of states meeting the NIEER benchmarks for minimum quality standards. Also, state funding for pre-kindergarten increased for the third year in a row. For some states, these increases seem to signal that after a period of financial recession in the country, state-funded pre-kindergarten is again performing to high-quality levels in access, standards met and funding (Barnett et al., 2016). Unfortunately, not all states moved forward; and some even regressed, including two of the nation's most

populated states, Texas and Florida. Looking across the nation, these trends mean that access to high-quality preschool remains highly unequal across the nation and is unlikely to change in the foreseeable future unless many more states change their trajectory (Barnett et al., 2008, Barnett et al., 2016).

From 2002 to 2015 there was a 15% increase in 4-year-old enrollments but a decrease in spending per child of $745. In 2016, the enrollment grew modestly by 31,863 nationwide, which is less than 1% growth. Even this modest growth was split among 3 and 4-year-olds with the growth of 7,091 and 24,772 children respectively. The most growth happened in New York, Michigan, South Carolina, and Alabama for 4-year-olds while Connecticut shifted program funding and therefore qualified existing programs as state pre-kindergarten. Also, a positive, Michigan and Hawaii joined states funding pre-kindergarten. Unfortunately, Texas, Florida, Kentucky, Tennessee, and Wisconsin decreased enrollment significantly. Eight states remain without state-funded pre-kindergarten this school year (Barnett et al., 2016).

Total funding for state pre-kindergarten programs increased in 2015 to $6.2 billion nationally. This marks an increase of more than $573 million across the combined 42 states and D.C. that offered pre-kindergarten in the 2014 school year. That is a 10% increase in real dollars. Most of the increase, approximately two-thirds, came from New York's initiative involving new investments in quality, full-day preschool for New York City students (Barnett et al., 2016).

While funding increases, enrollment totals are not growing in the way educators had hoped. The entire national enrollment totaled 1.4 million children attending state-funded pre-kindergarten. Since 2010, the national percentage of 3 and 4-year-olds served by a state-funded program has grown a disappointing 1%. Unstable funding in many states is counterproductive to

the growth of the program. With funding, some states are growing; however, others' funding, and often enrollment, shrunk, e.g., Florida, Tennessee, Texas, and Wisconsin. Nearly 2000 students were cut from each states' above programs in 2016 (Barnett et al., 2016).

In a positive direction, six states plus one program in Louisiana were celebrated as new recipients of the awards for meeting all 10 of NIEER's Quality Standards Benchmarks. West Virginia and Mississippi are the newest achievers of the 10-benchmark achievement. Another plus is that several states meeting the ten standards are also states with the highest percentages of student poverty. In addition to meeting the ten benchmarks, Mississippi began offering state-funded pre-kindergarten for the first time along with Hawaii. Indiana also began a pilot initiative that shows promise (Barrett et al., 2016).

Early Childhood Initiative of the Southern School District

The Southern District is a leader among its peers in early childhood education. The district boasts a unique school for 3-year-old students that is in partnership with the Community Action Project. This partnership has thrust the district forward in early childhood research, and many of the high-quality standards, practices, and research have been applied to the district-wide pre-kindergarten classrooms.

In the Southern District, early childhood education is growing. In 2014-15, the district saw a 22% increase in enrollment at its facility for three-year-olds ("Strategic Plan Progress," 2016). This facility houses four pre-kindergarten classes but is owned and follows guidelines developed by the Community Action Project. The district owns the land and is purchasing the building and materials from Community Action Project over some years. Due to it being a Community Action Project facility, the three-year-old program is available only to families that

meet the income requirements. The program has received multiple awards and accolades recognizing multiple aspects of the center.

In addition to the three-year-old program, the Southern District also provides a pre-kindergarten program available to all students. This universal pre-kindergarten program has grown each year as more families joined the district. Two to four pre-kindergarten classrooms are in each of the district's 13 elementary schools. The pre-kindergarten students and classrooms are the subjects of this study. During the study, four of the pre-kindergarten classrooms were moved to the Early Childhood Center due to space constraints at their neighboring elementary school. These classrooms followed Southern District guidelines during this time.

Program Characteristics

Classrooms in the Southern School District pre-kindergarten program vary slightly by teacher style and school, but all adhere to a series of standards. First, the teachers in each classroom are certified. The lead teacher holds a bachelor's degree or higher in education as well as an early childhood certificate from the state of Oklahoma. The teacher's assistant must have 48 college hours, have passed the Parapro test or the Oklahoma General Education Test. Some classrooms that receive Early Head Start funding have additional requirements for the teacher and aide. The number of Early Head Start classrooms varies by year and funding resources.

Classrooms are often an Americanized version of a Reggio Emelia classroom. The inspiration takes form in many ways. Reggio's philosophy that the environment is the third teacher makes the classroom's beauty an essential factor. Many of the classrooms exhibit muted, neutral color schemes; natural light and low light options; collections of rocks, bottle caps, sticks for crafts, learning, and imaginative play. Mixed in with these less ordinary materials are more

traditional items: magnet letters, small student whiteboards, a SMART board in every classroom, markers, small tables, and a classroom library. Teachers supplement most of their classroom supplies and materials, and, therefore, there is quite a bit of variance in environmental aesthetic. Every classroom has a class meeting area, often near the SMART board and large enough for whole class gatherings. Every classroom also has a word wall in which large letters are posted, and learned words are categorized by the first letter. Very commonly, the first words on the wall are the classroom student's names. Because there is not a set curriculum, there is some variance as to how much of the learning is affected by the Reggio Emilia inspiration. Most teachers have a small influence towards the approach but have not substantially changed their instructional practice.

Classrooms also share the same student-teacher ratio. Each classroom has one lead teacher, one assistant teacher, and either 20 or 22 children. The district-funded classrooms have 22 students while the Early Head Start-funded classrooms have 20. The state allows for 20 students in a classroom; however, the district has applied for and was granted a waiver to include the additional two students for several years. The Early Head Start-funded classrooms do not have an approved waiver, and, therefore, stop enrollment at 20 students.

Each classroom is housed in either the Early Childhood Center or a Southern District elementary school. This allows families across the district to access early childhood classrooms near their homes. Most children attend a school near their home; however, availability is first to come first served. For some families, traveling to another school further from their home is not possible and, therefore, the limit is their ability to access the program. These families are put on a waiting list for a particular school so the child can enroll later in the year in case of an opening.

While students in the Southern School District pre-kindergarten do not attend the special rotations of art, music, and physical education that their elementary peers enjoy, they do have a range of other activities available. Depending on the school site, they have access to additional time at the outdoor playground, the gymnasium, the computer lab, and to equipment from the art and music rooms to use in their classrooms.

Each Southern School District pre-kindergarten classroom offers breakfast and lunch. Lunch is served family style for those who did not bring a sack lunch from home. These meals are compliant with the United States Department of Agriculture (USDA) guidelines. Each meal includes a portion of meat, fruit, vegetable, bread, and milk. Each piece is offered, and students may choose what to eat from their plates. Pre-kindergarten students eat in their classrooms with their teachers. This is a time for learning table manners, social skills, and cooperation.

Following lunch is rest time. Schools vary in their set up for this portion of the day. Most often, the teacher and teacher's assistant help everyone lay out their mats, provided by the district and cover up with their blankets, brought from home. When quiet music is playing, the teacher leaves for a lunch or plan time leaving the children resting and the assistant to monitor.

The Southern School District pre-kindergarten school day matches the hours of the elementary school in which it resides. All students are at school 6 hours and 45 minutes with varying start times due to district bus schedules. Pre-kindergarten students are not permitted to ride school buses in Oklahoma and, therefore, are all collected by families at the end of the school day. The district provides before and after school care for a charge.

As a participating Oklahoma district, the Southern School District is a universal pre-kindergarten provider, with the district and state recognizing the value of providing high-quality schooling for young children (Gormley & Phillips, 2005). To keep this high-quality, those at the

school district level must analyze their programs' participant growth data and adjust where necessary to provide the highest possible quality for the state's youngest learners that will prepare them for learning in their elementary years (Magnuson et al. 2003; Magnuson et al., 2016).

Chapter 4: Methods

With intense national and local focus on improving reading education for all students, research has demonstrated that early interventions can be a successful tool to increase the number of proficient readers (Currie & Thomas, 1993; Currie & Thomas, 1996; Duncan & Magnuson, 2013). National data, however, should not be used for judgments of performance at the local level. District leaders need evidence on how well their desired outcomes for early learning opportunities are being achieved. For this reason, the purpose of this study was to evaluate literacy outcomes for students who completed the Southern School District's pre-kindergarten program.

Design

The design of this study was a non-experimental, descriptive study using longitudinal literacy data from students who participated in the district's pre-kindergarten program in the 2010-11 school year and those who did not. Achievement data were analyzed by Free and Reduced Lunch status and Limited English Proficiency status. Students' scores on the Fountas and Pinnell Reading Inventory were tracked from the first quarter of first grade to the fourth quarter of the third grade and concluded with their score on the Oklahoma Core Curriculum Test in Reading as third graders.

Data Source

Data, shown in Table 1, for this study came from the Southern School District, containing students both participating and not participating in the District pre-kindergarten program. The data contained 998 students who were Pre-kindergarten age during the 2010-2011 school year. The Southern School District provided test score data for thirteen occasions and indicators of the

student qualifications for the Limited English Proficient program and the Free and Reduced Lunch program. All data were de-identified to maintain the privacy of individual students.

Table 1

All Students Demographics

	Total #	Pre-K	No Pre-K	FRL	No FRL	LEP	No LEP	FRL + LEP
All	998	46%	54%	68%	32%	36%	64%	32%
Pre-K	460			60%	40%	39%	61%	33%
No Pre-K	538			74%	26%	34%	66%	31%
FRL	674	60%	74%			48%	52%	
No FRL	324	40%	26%			12%	88%	
LEP	361	39%	34%	48%	12%			
No LEP	637	61%	66%	52%	88%			
FRL + LEP	321	33%	31%					

Reading Assessments

To identify student reading proficiency, student reading levels were measured by the Fountas and Pinnell Reading Inventory, taken quarterly from first to third grade and the Oklahoma Core Curriculum Reading Test, taken at the end of the students' third-grade year. To best understand the results, it is useful to understand the structure of each assessment and use within the Southern School District.

The Fountas and Pinnell Reading Inventory and the subsequent scoring was commonly referred to as a child's "reading level" in the Southern District and was the primary reading assessment for the Southern School District. This system of reading levels was developed by Irene Fountas and Gay Su Pinnell to support their guided reading method. For the assessment, various reading texts are classified according to a set of parameters, such number of words, high-frequency words, sentence length, and complexity. The student read the first portion aloud and

then was prompted to continue reading to himself/herself halfway through the text. While the child read aloud, the teacher used the modified text to score the student's oral reading rate, accuracy, self-correction ratio, and fluency. After the child read the section to himself/herself, he/she was asked questions about the text, which were provided by the assessment. Answers were provided which were acceptable, and the teacher used the child's response accuracy to collect a comprehension score.

By combining the fluency and comprehension portions of the assessment, the teacher was able to measure the student's ability to read fluently and comprehend meaning on the reading level which the assessment was given. If a child's combined fluency and comprehension score was 94% or below, then the process was repeated with a lower level text. If a child's combined fluency and comprehension score was 95% or above, the process was repeated for a more difficult level. Once the correct level has been measured, the teacher marked this as the child's Independent Reading Level, or IRL. To determine how a child's performance on the assessment aligned with Fountas and Pinnell norms, the assessment group published a Reading Level Text Gradient (Appendix A), which assigns grade-level goals for reading levels. The Southern District used this same gradient and assigned each grade a set of levels to work towards every nine weeks. Teachers and administrators in the Southern District often referred to the item as the "reading level expectations" for a certain part of the year. For example, a student in 4th grade was to be mastering a "level R" by the 3rd nine weeks in the school year. This test has high validity with convergent scores of .94 for Fiction and .93 for Non-Fiction in a national evaluation. The reliability was also high with a score of .93 from a test-retest method.

To understand these results entirely, it is also essential to understand how the quarterly assessment changes as a child ages from first to third grade. The Fountas and Pinnell Reading

Inventory is nationally normed against other students in the same quarter and grade as the child being measured. Therefore, as the school year passes, the levels which are indicated as proficient grow as well. For example, in the first quarter of first grade, Level D text is considered a *Meeting Reading Expectations* text for a child, however, by third quarter in first grade, this is raised to Level H. If a child were to stay a Level D, he/she would be marked in the *Meeting Reading Expectations* performance category in the first quarter and be marked in the *Below Reading Expectations* performance category in the third quarter. For a full chart of Fountas and Pinnell proficiency scores, please see Appendix A.

After collecting data, teachers reported to the district and families via digital report card entry every nine weeks. This information was collected quarterly from the time a child entered the district through the end of their third-grade year. For this study, only complete sets of data were included. To prepare the data, the resulting twelve scores were assigned an ordinal variable to represent the proficiency category which their score fell within (Fountas and Pinnell, 2015). A score of "1" indicated that a student *Does Not Meet Reading Expectations*. A score of "2" indicated that a student is *Approaching Reading Expectations*. A score of "3" indicated that a student *Meets Reading Expectations*. A score of "4" indicated that a student *Exceeds Reading Expectations*.

Further, students were measured using the Oklahoma Core Curriculum Reading Test at the end of third grade. The test was written and scored by the state, using classroom teachers as test proctors along with a testing monitor, often another teacher or community citizen to ensure fairness of testing. These scores were provided to the Southern School District by the State of Oklahoma Department of Education which then assigned student scores a ordinal score as well as a corresponding performance category as determined by the cut scores of the year tested. To

prepare the data, the score was assigned a ordinal variable to represent the proficiency category which their score fell within. A score of "1" indicated a student had *Unsatisfactory* reading performance. A score of "2" indicated a student had *Limited Knowledge* reading performance. A score of "3" indicated a student had *Proficient* reading performance. A score of "4" indicated a student scored *Advanced* reading performance. This test has a teacher panel which confirms the validity for content, clarity and grade level appropriateness. When reliability was measured with Cronbach's alpha, the test scored a .90 with a standard error of measurement being 2.87.

There was a small group of students that was not given a score for the Oklahoma Core Curriculum Reading Test and therefore could not be included in the dataset. Those students had entered the United States within the last two school years and spoke another language. These scores were coded as ELL 1, meaning it was their first year in the country or ELL 2, meaning that it was their second year in the country. No matter English proficiency, his/her score was counted upon their third school year in the United States.

Analysis

The proposed research questions required a descriptive trend analysis, cross-tabulation and a logistical regression. For the descriptive analysis, reports the percentage of children who were able to read in each performance category for first-grade first quarter and third-grade fourth quarter. Data from the Oklahoma Core Curriculum Reading Test were used to describe the percentages of children who scored in each performance category at the end of third grade. Students were then compared based on pre-kindergarten attendance or non-attendance in the Southern School District, FRL status, as well as LEP status. Performance trends were also reported across the twelve test occasions. To do this, ordinal data were marked by performance category, converted into a numerical score and groups of scores were averaged.

All student scores were then averaged for each quarter to create a group mean score every nine weeks from first through third grade. The group mean was then labeled with the corresponding performance category. This was repeated to create comparison groups for children attending and not attending pre-kindergarten, students qualifying and not qualifying for the Free and Reduced Lunch program and students qualifying and not qualifying as Limited English Proficient.

A cross-tabulation was performed to determine if the actual reading proficiency or non-proficiency rate for students attending the Southern School District pre-kindergarten was consistent with their expected rates. For the cross-tabulation, student scores were recategorized as Proficient or Not Proficient and assigned an ordinal variable. Student reading proficiency was analyzed in first and third grade by pre-kindergarten attendance. Following, student reading proficiency in first and third grade was also analyzed by two additional variables, Free and Reduced Lunch status and Limited English Proficient status.

For the third research question, a logistical regression was performed to confirm the plausible difference in reading proficiency based on a student's participation in the Southern School District pre-kindergarten. Student scores were categorized as Proficient or Not Proficient and assigned an ordinal variable. A logistical regression estimated the odds of student reading proficiency by three variables; District pre-kindergarten attendance or not, Free and Reduced Lunch status and Limited English Proficient status.

Threats to Validity

In analyzing these data, it is prudent to recognize limitations and potential threats to the validity of findings. In the case of internal validity, one threat was of human error or

misjudgment. Teachers collected data via verbal response on twelve of the thirteen occasions measured, with the final occasion being collected in written form only. Human data collection both benefited the accuracy of the assessment and likely fell prey to human error. In working with many young learners, it was determined that the benefit of a familiar assessor, often the classroom teacher, outweighed the negative implications, for example, shyness to a stranger, and made the data a more valid picture of student ability (Gormley & Phillips, 2005; Gormley et al. 2011).

A second internal validity threat was in participant selection. While the pre-kindergarten program at the Southern School District is available to all children, children who attend the school district's three-year-old Community Action Project program were given additional advertisement, early registration and home visits in order to ensure enrollment of these children in the Southern School District pre-kindergarten program. To have qualified for the three-year-old program, families must qualify as low-income families as defined by Federal Poverty Guidelines. This may inadvertently cause the program participants to have a higher percentage of FRL than the district as a whole or for the FRL group in the study to have had more opportunity for early childhood exposure than their non-FRL peers.

A third threat to internal validity is the lack of a true null group for comparison to District pre-kindergarten attendees. Children in the group who did not attend District pre-kindergarten have a number of unknown variables. Such variables include attendance in another early childhood program, time spent with a caregiver on academic skills, as well as non-academic traits such as caregiver type (parental care or daycare). This variance in experiences may have affected, potentially positive or negative, on non-participant outcomes in the study.

A final threat to internal validity is the lack of data for the children in their Kindergarten school year. While pre-kindergarten attendance was tracked and quarterly measurements began in the first quarter of first grade, as is district standard, the intervention effect may have faded or not been fully captured by beginning measurements a full school year after pre-kindergarten had ended. We cannot, therefore, dismiss the possibility of missed short-term effects for participants.

External validity reflects the generalizability of the findings. These data come from one cohort of students in one urban school district. The evidence has generalizability for this district but should not be used in making inferences about other early childhood programs.

Chapter 5: Results

The purpose of this section is to present evidence related to the three research questions. Within each of the questions, evidence on the reading performance of Free and Reduced Lunch students (FRL) and Limited English Proficient students (LEP) is also presented.

1. What were the trends in reading achievement for students who attended pre-kindergarten in the Southern School District compared to those children who did not attend pre-kindergarten in the Southern School District?

2. Was there a difference in reading proficiency scores in first grade or third grade between students who attended pre-kindergarten in the Southern School District compared to those children who did not attend pre-kindergarten in the Southern School District?

3. What was the relationship between pre-kindergarten attendance in the Southern School District and third-grade reading proficiency as measured by the Oklahoma Core Curriculum Reading Test?

Research Question 1: Reading Achievement by Pre-kindergarten Enrollment

To address the first research question, descriptive statistics present trends in reading achievement for students in the sample. This included students who attended pre-kindergarten in the Southern School District and children who did not attend pre-kindergarten in the Southern School District. Student reading achievment was measured using the Fountas and Pinnell Reading Inventory by their classroom teacher for each quarter in first grade through third grade. This resulted in twelve reading proficiency scores per child. Each score was assigned an ordinal variable to represent the proficiency category which their score fell within (Fountas and Pinnell,

2015). A score of "1" indicated that a student *Does Not Meet Reading Expectations*. A score of "2" indicated that a student is *Approaching Reading Expectations*. A score of "3" indicated that a student *Meets Reading Expectations*. A score of "4" indicated that a student *Exceeds Reading Expectations*. These 12 scores were combined and averaged for each quarter to create a mean score every nine weeks from first through third grade.

As reported in Figure 2, students who attended pre-kindergarten in the Southern School District had a mean reading proficiency score of 2.02 in the first quarter of first grade. This group mean indicates the average student scored within the *Approaches Reading Expectations* performance category. Comparatively, students who did not attend pre-kindergarten in the Southern School District had a mean score of 2.03. This group mean also indicates a score of *Approaches Reading Expectations* in the first quarter of first grade.

Average reading scores decreased slightly across the first-grade testing occasions. Pre-kindergarten students in the Southern School District's program had average scores of 1.96, 2.00 and 1.91 from the second quarter to the fourth quarter of first grade. Students who did not attend District pre-kindergarten also experienced a slight decline in reading achievement during first grade. For these students, averaged scores were 2.02, 2.01 and 1.94. By the fourth quarter, both students who did and did not attend District pre-kindergarten scored on average at the top of the *Does Not Meet Reading Expectations* performance category.

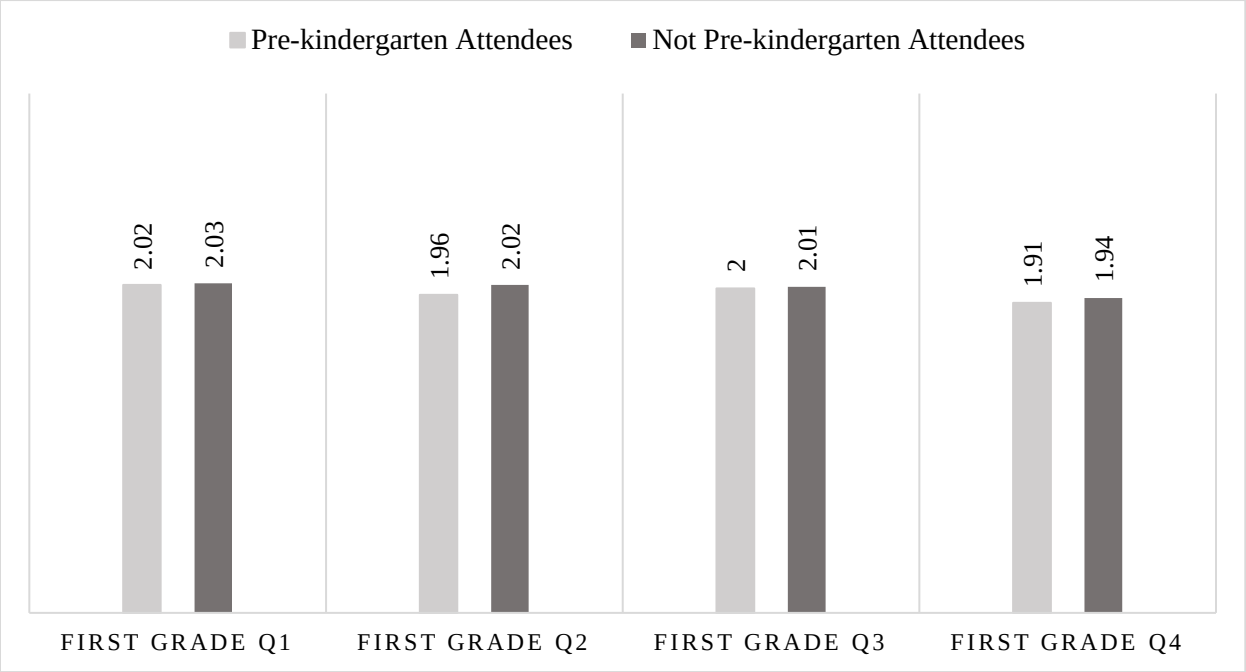

Figure 2. First Grade Mean Reading Score by Pre-kindergarten Attendance. Values between 1-2 indicated that the group mean *Does Not Meet Reading Expectations*. Values between 2-3 indicated that the group mean was *Approaching Reading Expectations*. Values between 3-4 indicated that the group mean *Meets Reading Expectations*. A score of 4 indicated that the group mean *Exceeds Reading Expectations*.

As seen in Figure 3, in the second-grade first quarter, students who attended pre-kindergarten had a mean reading proficiency score of 2.02, which was exactly back to their first grade first quarter mean score. This group mean indicates the average student scored in the bottom of the *Approaches Reading Expectations* performance category. By comparison, students who did not attend pre-kindergarten in the Southern School District had a mean score of 2.05. This group mean also indicates a score of *Approaches Reading Expectations*.

Average reading scores increased across the second-grade testing occasions. Pre-kindergarten students in the Southern School District's program had average scores of 2.28, 2.38 and 2.41 from the second quarter to the fourth quarter of second grade. Students who did not

attend District pre-kindergarten also experienced increases in reading achievement during second grade. For these students, averaged scores were 2.25, 2.37 and 2.43. By the fourth quarter students who did not attend District pre-kindergarten scored on average in the *Approaches Reading Expectations* performance category.

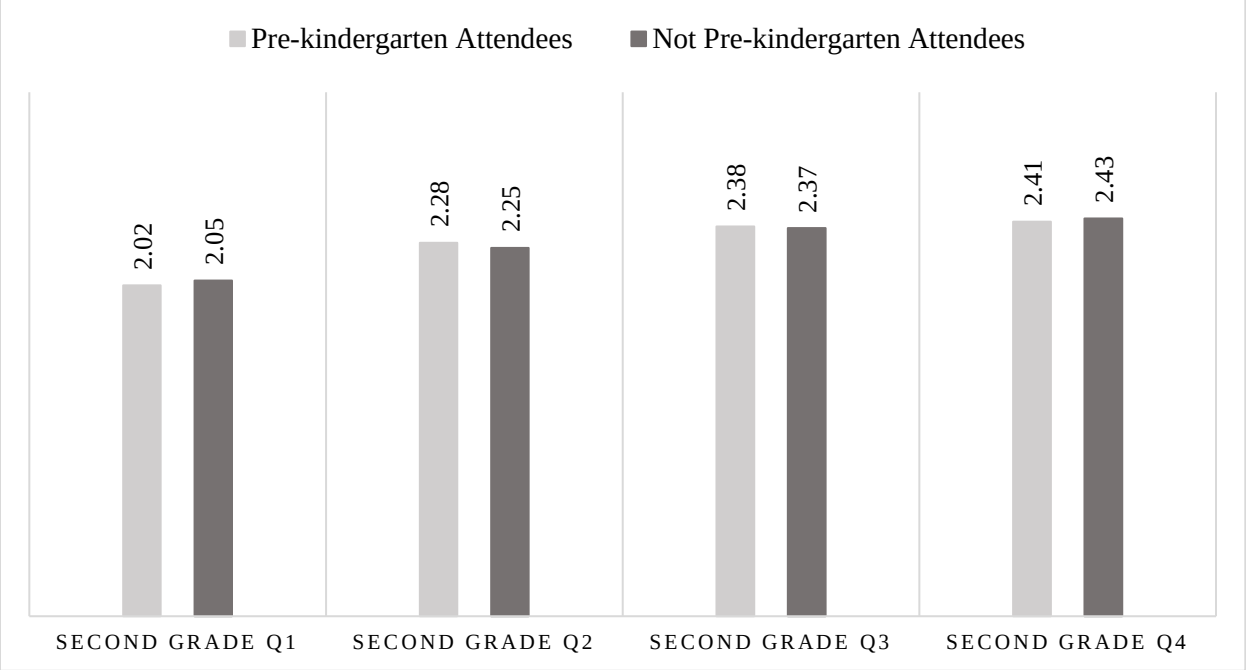

Figure 3. Second Grade Mean Reading Score by Pre-kindergarten Attendance. Values between 1-2 indicated that the group mean *Does Not Meet Reading Expectations*. Values between 2-3 indicated that the group mean was *Approaching Reading Expectations*. Values between 3-4 indicated that the group mean *Meets Reading Expectations*. A score of 4 indicated that the group mean *Exceeds Reading Expectations*.

Figure 4 presents evidence for third grade. During the third grade first quarter, students who attended pre-kindergarten had a mean reading proficiency score of 2.47. This group mean indicates the average student scored in the middle of the *Approaches Reading Expectations* performance category. By comparison, students who did not attend pre-kindergarten in the

Southern School District had a mean score of 2.38. This group mean also indicates the average student scored in the *Approaches Reading Expectations* performance category.

Average reading scores increased in the first and second quarter of third grade, followed by a decline in the third and fourth quarters. Pre-kindergarten students in the Southern School District's program had average scores of 2.48, 2.37 and 2.19 from the second quarter to the fourth quarter of third grade. Students who did not attend District pre-kindergarten also experienced decreases in reading achievement during third grade. For these students, averaged scores were 2.49, 2.33, and 2.22. By the fourth quarter students who did not attend District pre-kindergarten scored on average in the *Approaches Reading Expectations* performance category.

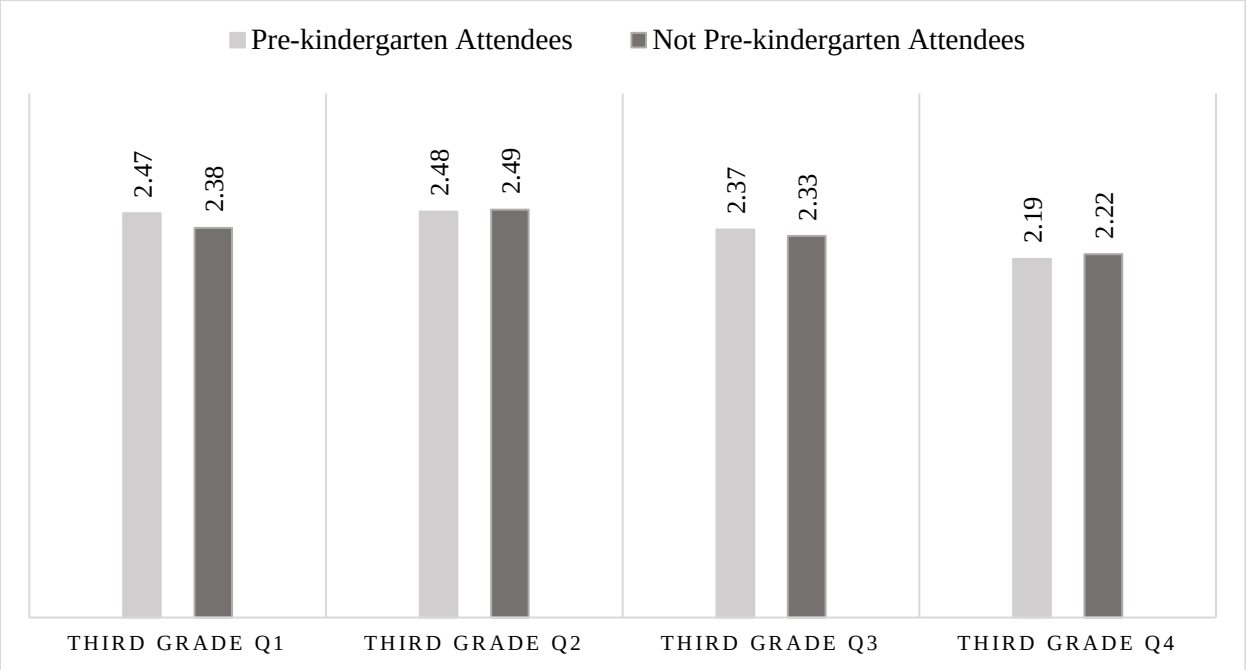

Figure 4. Third Grade Mean Reading Score by Pre-kindergarten Attendance. Values between 1-2 indicated that the group mean *Does Not Meet Reading Expectations*. Values between 2-3 indicated that the group mean was *Approaching Reading Expectations*. Values between 3-4 indicated that the group mean *Meets Reading Expectations*. A score of 4 indicated that the group mean *Exceeds Reading Expectations*.

In summary, the three figures illustrate that throughout the entirety of their early childhood school years, this sample of students from the Southern School District who attended District pre-kindergarten never achieved a group mean score indicating that they were *Meeting or Exceeding Reading Expectations*. The group mean grows slightly from the beginning of first grade to the end of third grade with a slight swell in second grade. The highest mean for the group was in third grade during the second quarter with a mean of 2.48. This group mean indicates the average student scored towards the middle of the *Approaching Reading Expectations* performance category. The lowest mean for the group was in first grade during the fourth quarter with a mean of 1.92. This group mean indicates the average student scored at the top of the *Does Not Meet Reading Expectations* performance category.

Students who attended District pre-kindergarten had average scores indicating *Approaching Reading Expectations* in 10 out of 12 occasions with the remaining two occasions measuring average scores in the *Does Not Meet Reading Expectations* performance category. Students who did not attend District pre-kindergarten had average scores indicating *Approaching Reading Expectations* in eleven out of twelve occasions with the remaining occasion measuring average scores in the *Does Not Meet Reading Expectations* performance category.

Another indicator of reading performance is the percentage of students *Meeting or Exceeding Reading Expectations*. The data in Table 2 shows that students attending District pre-kindergarten started the first grade with 32% of children *Meeting or Exceeding Reading Expectations*, leaving 68% of students who did not reach expectations. Comparatively, 34% of students who did not attend District pre-kindergarten scored in the *Meeting or Exceeding Reading Expectations* categories at the first quarter of first grade. By third grade fourth quarter, 43% of District pre-kindergarten students scored in the *Meeting or Exceeding Reading*

Expectations performance categories compared to 44% of students who did not attend District pre-kindergarten. These changes reflect an 11% increase in students' achieving expectations. When the groups were measured by the OCCT, District pre-kindergarten students slightly outperformed their non-attending peers. Comparing the two groups, 64% of District pre-kindergarten attendees scored *Proficient or Advanced*, while 62% of non-attendees were able to do the same. From this data, pre-kindergarten in the Southern School District did not seem to have a large effect on the reading proficiency of the students in the sample.

Table 2

All Students Reading Proficiency by Performance Category

	First Grade Q1				Third Grade Q4				Third Grade OCCT			
	Below	Approaches	Meets	Exceeds	Below	Approaches	Meets	Exceeds	Unsatisfactory	Limited Knowledge	Proficient	Advanced
All Students	44	24	20	13	43	14	23	20	20	17	60	3
District Pre-K	43	26	19	13	44	14	23	20	19	18	61	3
No District Pre-K	45	21	21	13	42	15	23	21	22	16	59	3

Note: All Students Reading Proficiency by Performance Category is reported by percentage of group.

Reading Achievement by Free and Reduced Lunch Status

Due to numerous studies linking poverty to lower student reading achievement, data were examined to assess difference in reading achievement between FRL students and non-FRL

students in the Southern School District (Camilli et al., 2010; Campbell et al., 2001; Garcia, 2015; Gormley and Phillips, 2005; Jensen, 2009; Magnuson et al., 2003; Reardon and Portilla, 2016). As shown in Figure 5, in first grade during the first quarter, FRL students had a mean score of 1.76, which was lower than the mean score of 2.48 for students who did not qualify for FRL. This discrepancy remained throughout the twelve data points from first through third grade. In seven of the twelve quarters, students in the FRL group had a group mean between 1.0 and 2.0 which indicates that the average student in the group *Did Not Meet Reading Expectations* that quarter. Comparatively, non-FRL students had a higher mean which mostly varied between approximately 2.5 and 3.0 indicating that the average student in the group was *Approaching Reading Expectations* for that quarter.

FRL average reading scores decreased during first grade followed by a steady increase until third grade third and fourth quarters, where they decreased again. In Figure 5, FRL students in the Southern School District's pre-kindergarten program had average scores of 1.64, 2.14 and 1.93 in the fourth quarter of first, second and third grade respectively. Non-FRL students experienced increases during first grade, followed by a decrease in the first grade fourth quarter. Further, the non-FRL students increased steadily until the third and fourth quarter of third grade, as had their FRL peers. Non-FRL students averaged scores were 2.44, 2.93, and 2.69 in the fourth quarter of first, second and third grade respectively.

By the fourth quarter of first and third grades, FRL students scored on average in the *Does Not Meet Reading Expectations* performance category. FRL students increased in the fourth quarter of second grade with students scoring on average in the *Approaches Reading Expectations* performance category. Comparatively, by the fourth quarter of first, second and third grades, non-FRL students scored on average in the *Approaches Reading Expectations*

performance category, with their second-grade average of 2.93 being at the top of this category. The non-FRL students scored on average in the *Meeting Reading Expectations* during the second quarter of third grade. This was the only quarter in which either students in FRL or non-FRL scored on average at or above proficient during the twelve quarters measured.

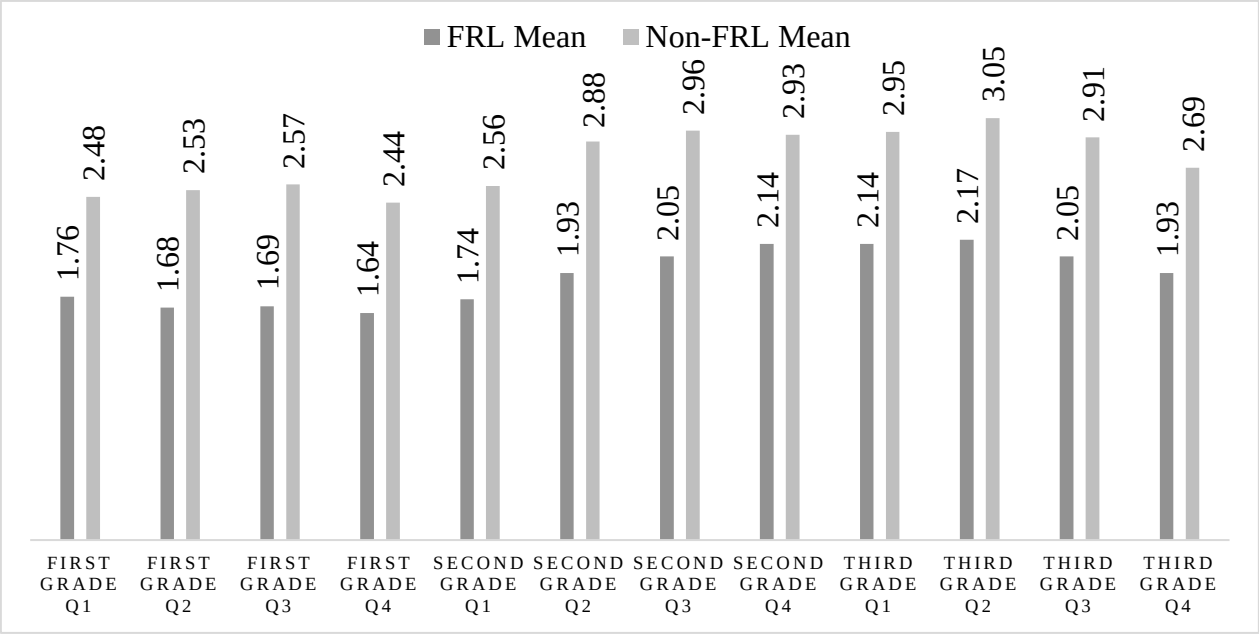

Figure 5 Mean Reading Score by Free and Reduced Lunch Status

Table 3 reports the percentage of students scoring in each performance category by FRL status. In the sample, 23% of FRL students and 50% of non-FRL students were *Meeting or Exceeding Reading Expectations* in the first quarter of first grade. By third grade fourth quarter, 33% of FRL students and 61% of non-FRL students were *Meeting or Exceeding Reading Expectations*. When reading proficiency was measured by the third grade OCCT, 53% of FRL students and 82% of non-FRL students were measured as *Proficient or Advanced* in their reading skills. In each quarterly measurement, FRL students were outperformed by their non-FRL peers in reading proficiency according to the Fountas and Pinnell Reading Inventory and the OCCT.

Table 3 also compares reading performance for FRL and non-FRL by pre-kindergarten attendance. In the first grade first quarter, 21% of FRL students who attended District pre-kindergarten and 26% of FRL students who did not attend District pre-kindergarten were *Meeting or Exceeding Reading Expectations*. By third grade fourth quarter, 29% of FRL students who attended District pre-kindergarten were *Meeting or Exceeding Reading Expectations,* an increase of 8% from first to third grade. For FRL students who did not attend pre-kindergarten in the Southern School District, in the third-grade fourth quarter, 37% were *Meeting or Exceeding Reading Expectations,* a growth of 11% from first to third grade. When reading proficiency was measured by the third grade OCCT, 50% of FRL Pre-kindergarten students and 56% of FRL non-attendees were measured as *Proficient or Advanced* in their reading skills. These results indicate that FRL students who did not attend District pre-kindergarten increased the percent of proficient students more than the students who attended District pre-kindergarten. In addition, both due to initial performance and due to higher growth, FRL students who did not attend District pre-kindergarten, had a higher percentage of students *Meeting or Exceeding Reading Expectations* than their peers who attended the program both in first and third grades.

Table 3

FRL Reading Proficiency by Performance Category

	First Grade Q1				Third Grade Q4				Third Grade OCCT			
	Below	Approaches	Meets	Exceeds	Below	Approaches	Meets	Exceeds	Unsatisfactory	Limited Knowledge	Proficient	Advanced
All FRL	55	22	16	7	52	16	21	12	28	20	52	1
FRL + District Pre-k	54	25	15	6	55	15	18	11	28	22	50	0
FRL + No District Pre-k	55	19	17	9	48	16	24	13	27	18	55	1
All No FRL	24	26	27	23	27	12	26	35	6	12	75	7
No FRL + District Pre-k	26	27	24	22	27	12	29	32	6	13	76	6
No FRL + No District Pre-k	19	24	34	23	25	13	20	42	8	11	72	9

Note: FRL Reading Proficiency by Performance Category is reported by percentage of group.

Reading Achievement by Limited English Proficient Status

Due to frequent findings of a connection between language development and reading proficiency (August & Hakuta, 1997; Johnson, 1992; Kelly et al., 2008; Slavin & Cheung, 2004), LEP status was utilized to determine if student language proficiency affected reading achievement in the Southern School District. As shown in Figure 6, in first grade during the first quarter, LEP students had a mean score of 1.47, which was lower than students who did not qualify for the program who had a group mean of 2.33. This discrepancy remained throughout

the twelve data points from first through third grade. In all twelve quarters, students in the LEP group had a group mean between 1.0 and 2.0 which indicates that the average student in the group *Did Not Meet Reading Expectations* that quarter. Comparatively, non-LEP students had a higher mean which mostly varied between approximately 2.3 and 2.8 indicating that the average student in the group was *Approaching Reading Expectations* for that quarter.

LEP average reading scores decreased during first grade followed by a steady increase until third grade where scores remained constant until the third and fourth quarters when they decreased again. LEP students in the Southern School District's program had average scores of 1.37, 1.92 and 1.73 in the fourth quarter of first, second and third grade respectively. Non-LEP students experienced mean decreases during first grade, followed by an increase from second grade. Following the same trend as LEP, FRL and non-FRL groups, the non-LEP students increased steadily until the third and fourth quarter of third grade, when scores decreased. Non-LEP students averaged scores were 2.24, 2.70, and 2.47 in the fourth quarter of first, second and third grade respectively.

By the fourth quarter of first, second and third grades LEP students scored on average in the *Does Not Meet Reading Expectations* performance category. Comparatively, by the fourth quarter of first, second and third grades, non-LEP students scored on average in the *Approaches Reading Expectations* performance category, with their second-grade average of 2.70 being towards the top of this category.

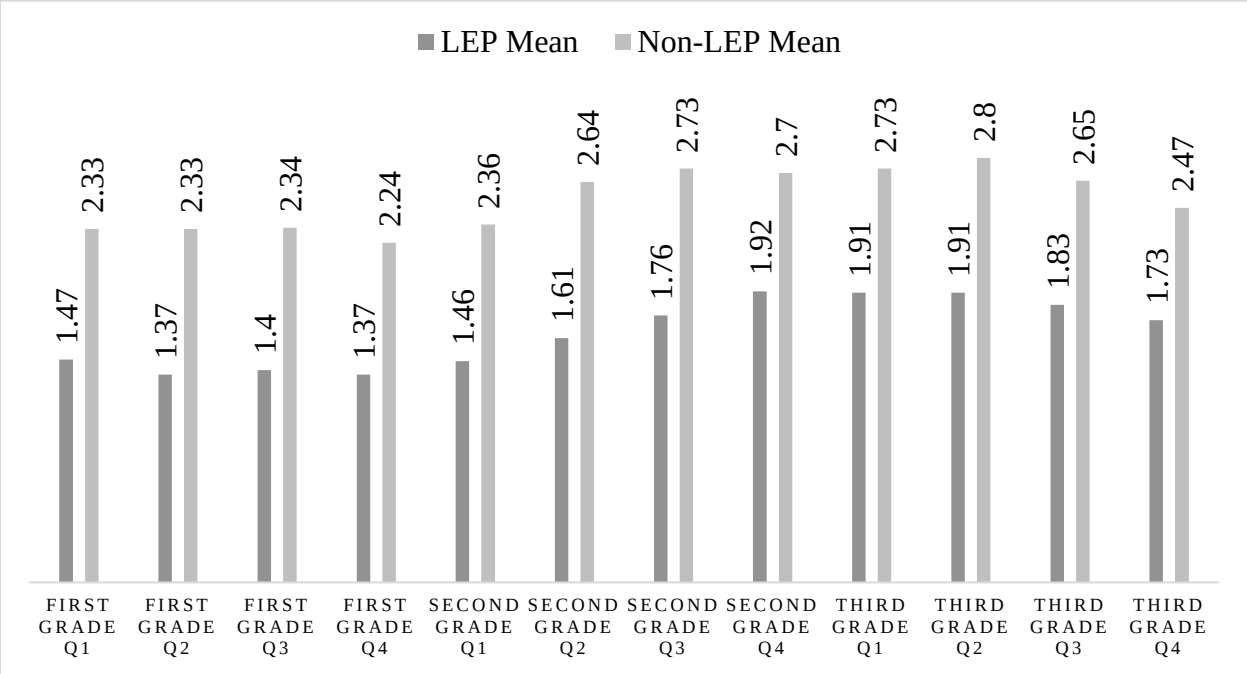

Figure 6. Mean Reading Score by Limited English Proficient Status

Table 4 reports the percentage of students scoring in each performance category by LEP students. In the sample, 12% of LEP students and 44% of non-LEP students were *Meeting or Exceeding Reading Expectations* in the first quarter of first grade. By third grade fourth quarter, 24% of LEP students and 53% of non-LEP students were *Meeting or Exceeding Reading Expectations*. When reading proficiency was measured by the third grade OCCT, 47% of LEP students and 72% of non-LEP students were measured as *Proficient or Advanced* in their reading skills. In each quarterly measurement, LEP students were outperformed by their non-LEP peers in reading proficiency according to the Fountas and Pinnell Reading Inventory and the OCCT.

Table 4 also compares reading performance for LEP and non-LEP by pre-kindergarten attendance. In the first grade first quarter, 11% of LEP students who attended District pre-

kindergarten and 13% of LEP students who did not attend District pre-kindergarten were *Meeting or Exceeding Reading Expectations*. By third grade fourth quarter, 23% of LEP students who attended District pre-kindergarten were *Meeting or Exceeding Reading Expectations,* an increase of 12% from first to third grade. For LEP students who did not attend pre-kindergarten in the Southern School District, in the third-grade fourth quarter, 26% were *Meeting or Exceeding Reading Expectations,* a growth of 13% from first to third grade. When reading proficiency was measured by the third grade OCCT, 47% of LEP Pre-kindergarten students and 46% of LEP non-attendees were measured as *Proficient or Advanced* in their reading skills. These results indicate that LEP students both who attended and did not attend District pre-kindergarten increased the percent of proficient students similarly. LEP students who did not attend District pre-kindergarten increased the percent of proficient students more than the students who attended District pre-kindergarten. In addition, both due to initial performance and due to higher growth, LEP students who did not attend District pre-kindergarten, had a higher percentage of students *Meeting or Exceeding Reading Expectations* than their peers who attended the program both in first and third grades.

Table 4

LEP Reading Proficiency by Performance Category

	Below	Approaches	Meets	Exceeds	Below	Approaches	Meets	Exceeds	Unsatisfactory	Limited Knowledge	Proficient	Advanced
	First Grade Q1				Third Grade Q4				Third Grade OCCT			
All LEP	66	23	10	2	59	17	16	8	39	24	47	0
LEP + District Pre-k	65	24	9	2	64	14	18	5	30	24	47	0
LEP + No District Pre-k	66	21	12	1	52	22	14	12	30	24	46	0
All No LEP	31	24	25	19	34	13	26	27	15	13	68	4
No LEP + District Pre-k	29	27	25	20	31	13	26	29	12	14	69	4
No LEP + No District Pre-k	35	20	26	19	37	12	27	25	18	12	66	5

Note: LEP Reading Proficiency by Performance Category is reported by percentage of group.

Both FRL students and LEP students were outperformed by their peers in all twelve occasions measured by the Fountas and Pinnell Reading Inventory and on the OCCT. FRL students had average scores indicating *Approaching Reading Expectations* in five out of twelve occasions with the remaining occasions measuring average scores in the *Does Not Meet Reading Expectations* performance category. LEP students had average scores indicating *Does Not Meet Reading Expectations* in all twelve occasions. Although FRL and LEP students' scores were on average lower than their non-qualifying peer groups, FRL and LEP students grew their percent of students *Meeting or Exceeding Reading Expectations* more than their non-qualifying peers.

From first grade first quarter to third-grade fourth quarter, FRL students grew by 20% of students *Meeting or Exceeding Reading Expectations* performance category. In the same time, non-FRL students grew by 11% of students in the *Meeting or Exceeding Reading Expectations* performance category. From first grade first quarter to third-grade fourth quarter, LEP students grew by 12% of students *Meeting or Exceeding Reading Expectations* performance category. In the same time, non-LEP students grew by 9% of students in the *Meeting or Exceeding Reading Expectations* performance category. For FRL and LEP students, attendance in the Southern School District's pre-kindergarten program did not improve their scores. In both cases, a combination of higher initial performance and a higher growth rate of the groups was found for non-attending FRL and LEP students.

Due to the ability to change performance categories, it is also important to look at the group growth over time. In each quarter, sub-groups performed lower than their non-qualifying peers both for FRL qualifying students and for LEP students. To answer the second research question and gain more insight into these repetitive discrepancies, a cross-tabulation analysis was used.

Research Question 2: Difference in Reading Proficiency in First and Third Grade

A cross-tabulation was utilized to determine if the actual proficiency rate for students who did attend pre-kindergarten in the Southern School District and those children who did not attend pre-kindergarten in the Southern School District was consistent with their expected proficiency rate. Cross-tabulations calculate the actual number of proficient students compared to the expected proficiency rate by assessing the proportion of students attending pre-kindergarten in the Southern School District who were proficient to overall proficiency rates for

the entire sample of students (Table 5). This cross-tabulation calculation was completed for students in first grade, third grade and by FRL and LEP.

As reported in Table 5, first-grade students who attended District pre-kindergarten showed similar actual proficiency rates to their non-attending peers with mean proficient scores of 31% and 35% respectively. Based on the sample, it was expected that 141 students who had attended pre-kindergarten would score proficient in their first-grade reading while only 135 actually did, a difference of 6 students.

Third-grade students who attended pre-kindergarten also showed similar proficiency rates to their non-attending peers with mean proficient scores of 43% in both cases. Based on the sample, it was expected that 185 students who had attended pre-kindergarten would score proficient in their third-grade reading while only 184 actually did, a difference of 1 student. The reading proficiency differences at first and third grade were not statistically significant with Chi-Squares of 1.114 and .045 respectively.

Table 5

Pre-kindergarten Attendance by Grade Level Reading Proficiency Cross-Tabulations

Variable	Expected	Actual
First Grade Proficient		
Pre-kindergarten	33% or 141 students	31% or 135 students
Non-Pre-kindergarten	33% or 96 students	35% or 103 students
Third Grade Proficient		
Pre-kindergarten	43% or 185 students	43% or 184 students
Non-Pre-kindergarten	43% or 127 students	43% or 128 students

Note: First Grade Proficient Chi-Square = 1.114; Third Grade Proficient Chi-Square= .045

As seen in Table 6, when students qualifying for the FRL program were analyzed as a sub-group, the results for reading proficiency became statistically significant both in first and third grades. In first grade, children not qualifying for the FRL program had a nearly even split between proficient and not proficient while their qualifying peers had a wide gap of 77% not proficient with only 23% proficient. First grade FRL students showed lower proficiency rates to their non-FRL peers with mean proficient scores of 23% and 50% respectively. As Table 6 shows, based on the sample, it was expected that 154 students who qualified for FRL would score proficient in their first-grade reading while only 110 actually did, a difference of 44 students who were not meeting their expected rate.

Continuing on Table 6, third grade FRL students also showed lower proficiency rates to their non-FRL peers with mean proficient scores of 33% and 61% respectively. Based on the sample, it was expected that 201 students who qualified for FRL would score proficient in their third-grade reading while only 154 actually did, a difference of 47 students. The First Grade Proficient Chi-Square was 52.267 and the Third Grade Proficient Chi-Square was 55.145. Both had significant p-values to the .0001 level.

Table 6

Grade Level Reading Proficiency by Free and Reduced Lunch Status Cross-Tabulations

Variable	**Expected**	**Actual**
First Grade Proficient		
FRL	33% or 154 students	23% or 110 students
Non- FRL	33% or 84 students	50% or 128 students
Third Grade Proficient		
FRL	43% or 201 students	33% or 154 students
Non-FRL	43% or 111 students	61% or 158 students

Note: First Grade Proficient Chi-Square = 52.267; Third Grade Proficient Chi-Square= 55.145

Table 7 reports cross-tabulation results for LEP students. Results indicate that reading proficiency was statistically significant for students qualifying as LEP in first and third grade. In first grade, children qualifying as LEP showed 12% proficient and 88% not proficient. Children not qualifying were a more even split of 44% proficient and 56% not proficient. Based on the sample, it was expected that 86 students who qualified for LEP status would score proficient in

their first-grade reading while only 32 actually did, a difference of 64 students who were not meeting their expected rate.

In third grade, children qualifying as LEP showed growth to 24% proficient and 76% not proficient. The children not qualifying also showed growth and were still a more even split of 54% proficient and 47% not proficient. Based on the sample, it was expected that 113 students who qualified for LEP status would score proficient in their third-grade reading while only 63 actually did, a difference of 50 students who were not meeting their expected rate. The First Grade Proficient Chi-Square was 79.304 and the Third Grade Proficient Chi-Square was 60.076. Both had significant p-values to the .0001 level.

Table 7

Grade Level Reading Proficiency by Limited English Proficient Status Cross-Tabulations

Variable	**Expected**	**Actual**
First Grade Proficient		
LEP	33% or 86 students	12% or 32 students
Non- LEP	33% or 152 students	44% or 206 students
Third Grade Proficient		
LEP	43% or 113 students	24% or 63 students
Non-LEP	43% or 199 students	56% or 249 students

Note: First Grade Proficient Chi-Square = 79.304; Third Grade Proficient Chi-Square= 60.076

Cross-tabulation results suggest that while District pre-kindergarten attendance is not a strong indicator of reading proficiency in first or third grades, other factors such as a child's

English Proficiency level and Free and Reduced Lunch status do show a statistically significant relationship to their reading proficiency as measured by the Fountas and Pinnell Reading Inventory. With an alarming number of FRL and LEP students not meeting their expected rates in the cross-tabulations, the findings were confirmed with a logistical regression. The logistical regression was performed to determine if District pre-kindergarten attendance predicts a student's likelihood of scoring proficient on the OCCT.

Research Question 3: Pre-kindergarten Attendance and OCCT Reading Proficiency

A logistical regression was performed to determine the effects of Southern School District pre-kindergarten attendance on the likelihood of students scoring proficient on their third grade OCCT. Shown in Table 8, the model explained 23.3% of the variance in third-grade reading proficiency as measured by the Nagelkerke R^2 and correctly classified 67.5% of the students. Students qualifying for the Free and Reduced Lunch program or being Limited English Proficient had lower odds of passing the OCCT. Specifically, the odds of a proficient reading score on the OCCT decreased by 2.033 ($p < .01$) for FRL students, 2.716 ($p < .01$) for LEP students and 8.570 ($p < .01$) for IEP students. The logistical regression model for District pre-kindergarten enrollment did not find a statistically significant relationship with a p-value of .382, meaning that students who completed the Southern School District's pre-kindergarten program were no more likely to score proficiently on the 3rd grade OCCT than students who did not attend the Southern School District pre-kindergarten program.

Table 8

Third Grade OCCT Proficiency Regression Analysis and Model Summary

							95% C.I. for Exp(B)	
	B	**S.E.**	**Wald**	**df**	**Significance**	**Exp(B)**	**Lower**	**Upper**
Pre-k	.150	.171	.763	1	.382	1.161	.830	1.625
FRL	.710	.183	15.071	1	.000	2.033	1.421	2.909
LEP	.999	.190	27.562	1	.000	2.716	1.871	3.945
IEP	2.148	.366	34.541	1	.000	8.570	4.186	17.543
Constant	-3.212	.387	68.958					

-2 Log Likelihood	**Cox & Snell R Square**	**Nagelkerke R Square**
854.456	.174	.233

Summary of Results

Research Question 1:

- Students who attended District pre-kindergarten had average scores indicating *Approaching Reading Expectations* in ten out of twelve occasions with the remaining two occasions measuring average scores in the *Does Not Meet Reading Expectations* performance category.
- Students who did not attend District pre-kindergarten had average scores indicating *Approaching Reading Expectations* in eleven out of twelve occasions with the remaining occasion measuring average scores in the *Does Not Meet Reading Expectations* performance category.
- Students attending District pre-kindergarten started the first grade with 32% of students *Meeting or Exceeding Reading Expectations*.
- Students who did not attend District pre-kindergarten started the first grade with 34% of students *Meeting or Exceeding Reading Expectations*.
- In the third grade fourth quarter, 43% of students attending District pre-kindergarten scored in the *Meeting or Exceeding Reading Expectations* performance category.
- In the third grade fourth quarter, 44% of students who did not attend District pre-kindergarten scored in the *Meeting or Exceeding Reading Expectations* performance category.
- On the OCCT, District pre-kindergarten students slightly outperformed their non-attending peers with 64% of District pre-kindergarten attendees scored *Proficient or Advanced*, while 62% of non-attendees were able to do the same.

- Both FRL students and LEP students were outperformed by their peers in all twelve occasions measured by the Fountas and Pinnell Reading Inventory and on the OCCT.
- FRL students had average scores indicating *Approaching Reading Expectations* in five out of twelve occasions with the remaining occasions measuring average scores in the *Does Not Meet Reading Expectations* performance category.
- LEP students had average scores indicating *Does Not Meet Reading Expectations* in all twelve occasions.
- Although FRL and LEP students' scores were on average lower than their non-qualifying peer groups, FRL and LEP students grew their percent of students *Meeting or Exceeding Reading Expectations* more than their non-qualifying peers.

Research Question 2:

- Based on the sample, 33% of District pre-kindergarten attendees were expected to score proficient in the 1st grade, but only 31% reached this threshold.
- Based on the sample, 43% of District pre-kindergarten attendees were expected to score proficient in the 3rd grade, 43% reached this threshold.
- Based on the sample, 33% of FRL students were expected to score proficient in the 1st grade, but only 23% reached this threshold.
- Based on the sample, 43% of FRL students were expected to score proficient in the 3rd grade, but only 33% reached this threshold.
- Based on the sample, 33% of LEP students were expected to score proficient in the 1st grade, but only 12% reached this threshold.
- Based on the sample, 43% of LEP students were expected to score proficient in the 3rd grade, but only 24% reached this threshold.

Research Question 3:

- The model explained 23.3% of the variance in third-grade reading proficiency as measured by the Nagelkerke R^2 and correctly classified 67.5% of the students.
- The model revealed that District pre-kindergarten was not a significant variable with a p-value of .382.
- The odds of a proficient reading score on the OCCT decreased by 2.033 ($p < .01$) for FRL students, 2.716 ($p < .01$) for LEP students and 8.570 ($p < .01$) for IEP students.

Chapter 6: Discussion

The purpose of this study was to track the longitudinal reading performance of students enrolled in the Southern School District's pre-kindergarten program and compare to achievement trends of students who did not participate in the Southern School District's pre-kindergarten program.

The questions guiding this study were:

1. What were the trends in reading achievement for students who attended pre-kindergarten in the Southern School District compared to those children who did not attend pre-kindergarten?
    a. What were the trends for Free and Reduced Lunch students?
    b. What were the trends for Limited English Proficient students?
2. Was there a difference in reading proficiency scores in first grade and third grade between students who attended pre-kindergarten in the Southern School District compared to those children who did not attend pre-kindergarten?
    a. What were the differences for Free and Reduced Lunch students?
    b. What were the differences for Limited English Proficient students?
3. What was the relationship between pre-kindergarten attendance in the Southern School District and third-grade reading proficiency as measured by the Oklahoma Core Curriculum Reading Test?
    a. What was the relationship for Free and Reduced Lunch students?
    b. What was the relationship for Limited English Proficient students?

Results of the analyses provide critical insight into the reading development for this sample of students. Three findings in particular are worth considering with the larger body of evidence.

Reading Growth and Pre-kindergarten Attendance

The descriptive data revealed that for this sample of students, attendance at the Southern School District pre-kindergarten program neither produced initially higher reading performance for participants nor did participants grow the percentage of children scoring proficient between first and third grades more than their non-attending peers. Students attending District pre-kindergarten started the first grade with 32% of students *Meeting or Exceeding Reading Expectations* while students who did not attend District pre-kindergarten started the first grade with 34% of students *Meeting or Exceeding Reading Expectations.* At the end of the twelve measured quarters, in the third grade fourth quarter, 43% of students attending District pre-kindergarten scored in the *Meeting or Exceeding Reading Expectations* performance category, while 44% of students who did not attend District pre-kindergarten scored in the *Meeting or Exceeding Reading Expectations* performance category. With 1-2 percentage difference in reading achievement between program participants and non-participants, descriptive statistics found that attendance at the Southern School District's pre-kindergarten program did not have a measurably significant effect on student reading achievement.

In addition to lower initial and lower final reading performance, students who attended the Southern School District's pre-kindergarten program also lacked a higher growth rate than their non-attending peers. District pre-kindergarten started the first grade with 32% of children *Meeting or Exceeding Reading Expectations* and grew to 43% by the fourth quarter of third grade. Comparatively, students who did not attend District pre-kindergarten started first grade

with 34% of students *Meeting or Exceeding Reading Expectation* and grew to 44% by the end of third grade. These changes reflect an 11% increase in students' achieving expectations for both attending and non-attending groups.

These findings were in contrast to other studies in which early childhood program participants showed higher initial reading proficiency scores and also demonstrated higher growth rates than their non-attending peers. Perhaps the most similar study was Gormley, Gayer, Phillips and Dawson's 2005 study of Tulsa area pre-kindergarten programs which compared participant to non-participant achievement on the Woodcock-Johnson Achievement Test (Gormley, Gayer, Phillips, & Dawson, 2005). Pre-kindergarten participants in the Gormley study showed a three-point gain over the control group, on average, which contrast the data found in this study both by being positive for participants and also because participants grew at a higher rate than their non-attending peers.

The nonconvergent findings from this study with the Gormley study may have several causes. First, this study utilized the Fountas and Pinnell Reading Inventory which was given each quarter of first, second and third grades. Child achievement improvements from a pre-kindergarten experience may have lacked the persistence to be revealed on this examination which was given one to three years after the end of District pre-kindergarten. In Gormley's study, students were assessed upon entering Kindergarten just a few weeks after the completion of the Tulsa pre-kindergarten program (Gormley, Gayer, Phillips & Dawson, 2005). Similar diffusion of results was found in the study conducted by Gilliam and Ziegler in 2001. In their study, positive academic effects persisted through Kindergarten and first grade. This loss of measurable gains may also be confirmed by findings in Pianta's 2009 study where, although the

achievement gap was closed slightly for early childhood participants, the persistence of these effects dwindled over time (Pianta et al., 2009).

Another variable which could have led to varied findings was the variation in assessment type. Gormley's team utilized the Woodcock-Johnson Achievement Test, which is designed to capture the full intelligence profile of a child. The test includes areas such as processing speeds, short-term memory, and visual-spatial ability. Each of these areas may have been developed in the Southern School District participants, but not captured by the readings tests which were administered. If the District finds that the results from the reading tests alone may not fully measure the program's objectives, studies provide many examples of assessment which capture both academic improvements as well as other factors and may be of use in future data collection.

Effects on FRL Pre-kindergarten Attendance Findings

Further, in Gormley's study Hispanic, Black, White and Native American children all benefitted from the pre-kindergarten program as did children from low-income families, which in this study's sample from the Southern School District was indicated by FRL status (Gormley, Gayer, Phillips & Dawson, 2005). In this study, FRL and LEP students who attended pre-kindergarten did not show higher growth than non-attending peers. In this study, FRL students who attended District pre-kindergarten grew the percentage of students *Meeting or Exceeding Reading Expectations* by 8% while their FRL non-attending peers grew the percentage of students *Meeting or Exceeding Reading Expectations* by 11% from first to third grade. LEP students who attended District pre-kindergarten grew the percentage of students *Meeting or Exceeding Reading Expectations* by 12% while their LEP non-attending peers grew the percentage of students *Meeting or Exceeding Reading Expectations* by 13% from first to third grade.

The second key finding of the study was that the Southern School District pre-kindergarten program does reveal statistically significant effects, but with modest growth for the FRL qualifying participants which was also contrary to national studies of similar programs. This study does not lead to any positive claims about the relationship between District pre-kindergarten attendance and increased first or third-grade reading proficiency for low-income students. In the descriptive data, FRL students status showed a higher percentage of not proficient compared to their non-qualifying peers who have nearly even split in both 1st and 3rd grade. This finding indicates that this group of children is underperforming their average non-qualifying peer in reading throughout their reading development from 1st to 3rd grade.

As shown in Figure 5, the group mean for FRL students was lower than their non-FRL peers in each of the twelve measured quarters. Consistently throughout these twelve quarters, the FRL students performed, on average, a full performance category lower than their non-FRL peers. In Table 3, when comparing FRL students to their non-FRL peers, there are nearly 25% more students in the lowest performance category than their non-FRL peers. For FRL students, pre-kindergarten attendance did not dramatically change the percentages of children performing in the lower two performance categories. FRL District pre-kindergarten attendees do show a slight more percentage in proficient categories than non-attending peers, but the findings were so minute, that further analysis was conducted.

In the cross-tabulations of FRL students, the rate of proficiency of children with FRL status raises from 26% to 33% from 1st to 3rd grade. This indicates that over time the number of FRL status children not proficient would decrease and the percentage proficient may increase. As in a others, this study also indicates that the children with FRL status may or may not benefit from additional time; however additonal time to introduce math reasoning and language

construction to offset some of poverty's effects on children's vocabulary and development, has potential (Camilli et al., 2010; Campbell et al., 2001; Garcia, 2015; Gormley and Phillips, 2005; Jensen, 2009; Magnuson et al., 2003; Reardon and Portilla, 2016). The logistical regression analysis confirms this finding by showing that FRL status lowers the odds of scoring proficient on the OCCT by 2.033. These findings indicate that the District FRL students are struggling to achieve proficiency at the same rate as their more affluent peers and that District pre-kindergarten attendance is not enough of a mediator to bring their reading abilities to the proficient rate in first or third grades.

By contrast Camilli's work in 2010, which compared 123 national studies, and along with other studies, suggested the benefits of a high quality early learning experience for all students, especially students from high poverty backgrounds (Camilli et al., 2010; Campbell et al., 2001; Garcia, 2015; Gormley and Phillips, 2005; Jensen, 2009; Magnuson et al., 2003; Reardon and Portilla, 2016). Consistent with the historical research base, Camilli's team found significant positive effects for children who attended a preschool program prior to entering Kindergarten. The largest effect sizes were found for cognitive outcomes, but social and school readiness indicators also improved (Camilli et al., 2010). Garcia's 2015 study also confirmed that poverty negatively effects children with children in the bottom 20% of incomes studied showing 0.8 standard deviations lower achievement in reading and math and 0.4 standard deviations in persistence in completing tasks than children in the 20% of the incomes studied (Garcia, 2015). To offset these negative effects of poverty, McCartney et al.'s 2007 study found that higher quality child care can buffer the negative effects of low income for children. For receptive language and expressive language, higher quality care was associated with better outcomes for

children from low-income families, although with moderate effect sizes (McCartney et al., 2007), but these positive results are not consistent with this study's data.

Variables that may have led to contrasting findings for FRL students in the Southern School District begin with the study's definition of poverty. Children in this study were classified as low-income if they qualified for the Free and Reduced Lunch program. This definition included children qualifying for a partially reduced rate and up to children receiving free breakfast and lunch. Other studies define familial poverty using alternate indicators and by varying parameters. Due to this variance, children in this study may not have similar familial income to children in other studies. As previously evidenced, the familial income has a significant effect on child achievement outcomes (Reardon & Portilla, 2016) and therefore results for other studies, if indicators of poverty were not equally defined, cannot be directly compared. For future study, the district may employ a family questionnaire to ascertain the annual income of families and then study children based on reported income rather than qualification for the FRL program.

Effects on LEP Pre-kindergarten Attendance Findings

The third key finding of the study was that the Southern School District pre-kindergarten program does reveal statistically significant effects, but with modest growth for the LEP qualifying participants. The study does not lead to any major positive claims about the relationship between District pre-kindergarten attendance and increased first or third-grade reading proficiency for Limited English students. LEP status student data was in line with national data that showed LEP status students struggling to make measurable academic gains, especially in reading achievement (Camilli et al., 2010; Campbell et al., 2001; Garcia, 2015; Magnuson et al., 2003). This study's descriptive data revealed that far more LEP students were

in the non-proficient performance categories than their non-LEP peers according to all measurements used in first and third grades. In first grade, LEP status students only had a 12% proficiency rate while their non-qualifying peers had 44%. In third grade, LEP status students had 24% proficiency rate while their non-qualifying peers had 54%. This is a wide gap, which closes somewhat between 1st and 3rd grade.

By third grade, LEP students who had attended District pre-kindergarten had moved 14% of their group from non-proficient performance categories to proficient performance categories. Their non-attending LEP peers moved a similar percentage of students, but from *Does Not Meet Reading Expectations*, the lowest non-proficient category, to *Approaching Reading Expectations*, the second lowest, which left them still not reading at a proficient level in third grade. Although there were some differences between the students who attended District pre-kindergarten and those who did not attend on the Fountas and Pinnell measurements, the groups performed very similarly on the OCCT when considering the percentage of students in each performance category.

To confirm this finding, cross-tabulations were conducted and showed that the actual number of students who scored proficient was lower than the expected for each measurement. The group was expected to have 33% of students proficient while only 12% actually were in first grade. In third grade, 43% of students in the group were expected to score proficient while only 24% actually did. The group's consistent underperformance is a concern which was again confirmed by performing a logistical regression. The model found that the odds of an LEP student scoring proficient in reading on the OCCT decreased by 2.716 and was statistically significant. These findings indicate that the district LEP students are struggling to achieve proficiency at the same rate as their non-LEP peers and that District pre-kindergarten attendance

is not enough of a mediator to bring their reading abilities to the proficient rate in first or third grades.

Although District pre-kindergarten attendance did not substantially improve proficiency rates for LEP students, one plausible reason for this could be time spent developing the English language in their regular classroom and additionally in classes for English language development provided to the students during the school day, which then removed them from the regular pre-kindergarten classroom activities. By providing additional or in-class opportunities for student language acquisition, students would fully experience the additional 1,100 hours of schooling that District pre-kindergarten offers could provide.

Recommendations for the District and Early Childhood Leaders

The recommendations from this study must be viewed from a particular set of research conditions in the study. As with most research, it is essential to look at each study within the context of the larger body of research. While District pre-kindergarten attendance alone did not have a statistically significant relationship with reading proficiency, the District should look to those groups who are typically underperforming and seek to provide the most academic support for these children.

The first recommendation would be to study why the FRL and LEP students are, on average, being outperformed by their peers so consistently. The study's data concluded that FRL students were two times less likely to score proficient on the OCCT than their more affluent peers and the FRL student group scored lower than their more affluent peers on all twelve measured quarters. According to Coleman's 1966 study and Reardon & Portilla's 2016 study, proficiency in reading achievement is highly correlated to race and familial income. Other

studies have further inspected the more concrete reasons for children living in poverty to be underperforming their peers at school with higher dropout rates, lower language, and vocabulary skills, and lower brain function affecting their long-term memory, working memory and executive functioning skills (Evans et al., 2010; Farah et al., 2006; Hart & Risley, 2003; Jensen, 2009). In order to offset these negative effects of low familial income, the district must inspect and directly work towards gains in those areas such as long-term memory and vocabulary and language development for these children.

The LEP student group were also shown to be nearly three times less likely to score proficient on the OCCT and were consistently and significantly behind their non-LEP peers in the period studied. Interventions and modifications required for these students can include, small group testing, daily language intervention time, LEP courses designed to progress language acquisition and being tested in the child's native language. The language acquisition process is itself very complicated, and students may have artificially low scores due to these measurements being conducted by their English-speaking classroom teachers and the requirement that the child read and answer verbally in English. Although this group makes growth gains, there are multiple known contributors to the group growth and known limitations to the measurements for this particular sub-group.

In this study, students were not categorized by school, teacher or indicators of teacher effectiveness, such as the common, years taught. Therefore, while the structural quality of the programs is equal, the process quality of the pre-kindergarten classroom, especially important in language acquisition, may be highly variant. Process quality has come to the forefront in early childhood education as the need for quality programming to achieve desired outcomes also expanded. Currently, many districts use pre-kindergarten as an opportunity to provide children,

at an earlier age, exposure to math and language so to give all students equal footing in the more formalized kindergarten year (Hart & Risley, 2003). Based on robust evidence from studies like the Carolina Abecedarian study, Perry Preschool study and Gormley's study of Tulsa Public Schools preschools, many educational leaders assume that the early exposure to schooling, specifically early mathematical reasoning and language construction, will achieve higher achievement outcomes for their students because it for the locations where the research was conducted (Magnuson et al., 2016).

Blindly inferring from large-scale studies that offering an early childhood program will ensure school readiness and translate to better school performance is not adequate. Evidence showing increased reading, mathematical and social outcomes for early childhood participants cannot be applied to specific school district programs due to variance in programming (Magnuson et al., 2016). Similarly, just looking at program quality indicators and difference in contexts does not yield useful information to understand if programs are achieving intended outcomes.

In order to create the high-quality settings which returned positive results, a specific combination of structural and process qualities is needed. This combination will result in the experience a child participant is influenced by, and this child experience is directly related to participant outcomes (NICHD, 2002). Structural qualities tend to be regulated by a larger organization such as the state or national government and include features such as teacher-child ratios, group size, teacher education and specialized training for teachers (Vandell & Wolfe, 2000). While these qualities often have required minimums to receive government funding, school districts may create a higher level of structural quality for their program by establishing district minimums above the regulatory minimum. Examples of this would be district offering

additional teacher training, smaller class sizes, or providing additional teachers or teacher assistants to lower group sizes. Once the structural qualities of a program have been established to a high-quality level, process qualities, or the child's actual experience in an environment, can be addressed (Howes, Whitebook, & Phillips, 1992; NICHD 1996, 2000a). The process quality of a classroom is a measurable variable and district measurement of this could lead to significant data that would inform the District policy and training.

The second recommendation to the Southern School District would be to study potential reasons that the attendance of District pre-kindergarten did little to affect the achievement gap measured between the FRL and their more affluent peers. In the Southern School District, families qualifying for FRL were equally offered pre-kindergarten as their non-FRL peers. As shown in Table 3, the FRL were outperformed by their non-FRL peers in all thirteen measured occasions, which research had led us to expect (Hart & Risley, 2003). More concerning was that the FRL students who attended pre-kindergarten did not outperform their non-attending peers as was documented in other similar studies (Gormley, Gayer, Phillips & Dawson, 2005).

As seen in Table 3, in the first grade first quarter, 21% of FRL pre-kindergarten attendees were reading at a proficient level or higher while their non-attending peers had 26% at a proficient level or higher. As found in other studies, early childhood program participation effects can fade over time (Pianta et al., 2009). The first quarter of first grade was the first occasion measured after the program had concluded and therefore, should have been the quarter where the effect was most pronounced, and yet those positive effects were not present in the data. Later in the fourth quarter of third grade, 29% of FRL pre-kindergarten attendees and 37% of FRL non-attendees were reading at a proficient level or higher. When measured by the OCCT, FRL pre-kindergarten attendees were yet again outperformed by their FRL non-attending

peers with *Proficient* and *Advanced* scores of 50% and 56% respectively. This trend is concerning because it is in direct opposition to evidence of the assumption that District pre-kindergarten is of benefit for all children. In the case of FRL students, it seems that not attending could be more beneficial to a child. The District must further research the cause of this trend and to determine if the pattern holds for additional cohorts of students.

Recommendations for Further Research

This study has limitations due to student data limitations and research design. The scope should not be expanded and generalized into the broader context. Each district and state must capture and analyze its own data to determine if the development of its Early Childhood Program is positive or needs to be changed to create desired results. This particular program has multiple goals, which are stated but not always measured, such as social and emotional growth. The district could achieve a mechanism to capture the child's social and emotional development several times a year to determine if children who are behind in one or more of those areas may need additional support.

Findings may also be limited due to performance category scoring. Opposite of the *Ceiling Effect*, mentioned in Gormley and Phillips 2005 study, *an effect which skews data due to a child outperforming the test's top scores and thereby giving an artificially low score for their measurement*, this study may be experiencing a *Floor Effect* which skews data due to a child underperforming the measurement's lowest scores and thereby giving them an artificially low growth score for the time measured. In the case of this study, this may be children who are performing very much below grade level in first grade and making two or three school years of reading achievement gains, only to still find themselves in the very lowest performance category

still. Performance banding shows that this child started and ended in the lowest category and as researchers, we assume no significant growth happened, while this may be incorrect.

In conclusion, the Southern School District's pre-kindergarten as a mechanism for Early Childhood Intervention will continue to evolve and necessitate district-level analysis of increased reading achievement as well as other district goals. Findings from this study raise questions about the most effective ways to support teachers and our youngest students. While this research does not provide transferable answers, it does point to the effects of early childhood interventions. The effects of pre-kindergarten, mostly unmeasured at the most district levels, requires specific setting research before developing the program for maximum outcomes towards that district's specific achievement goals.

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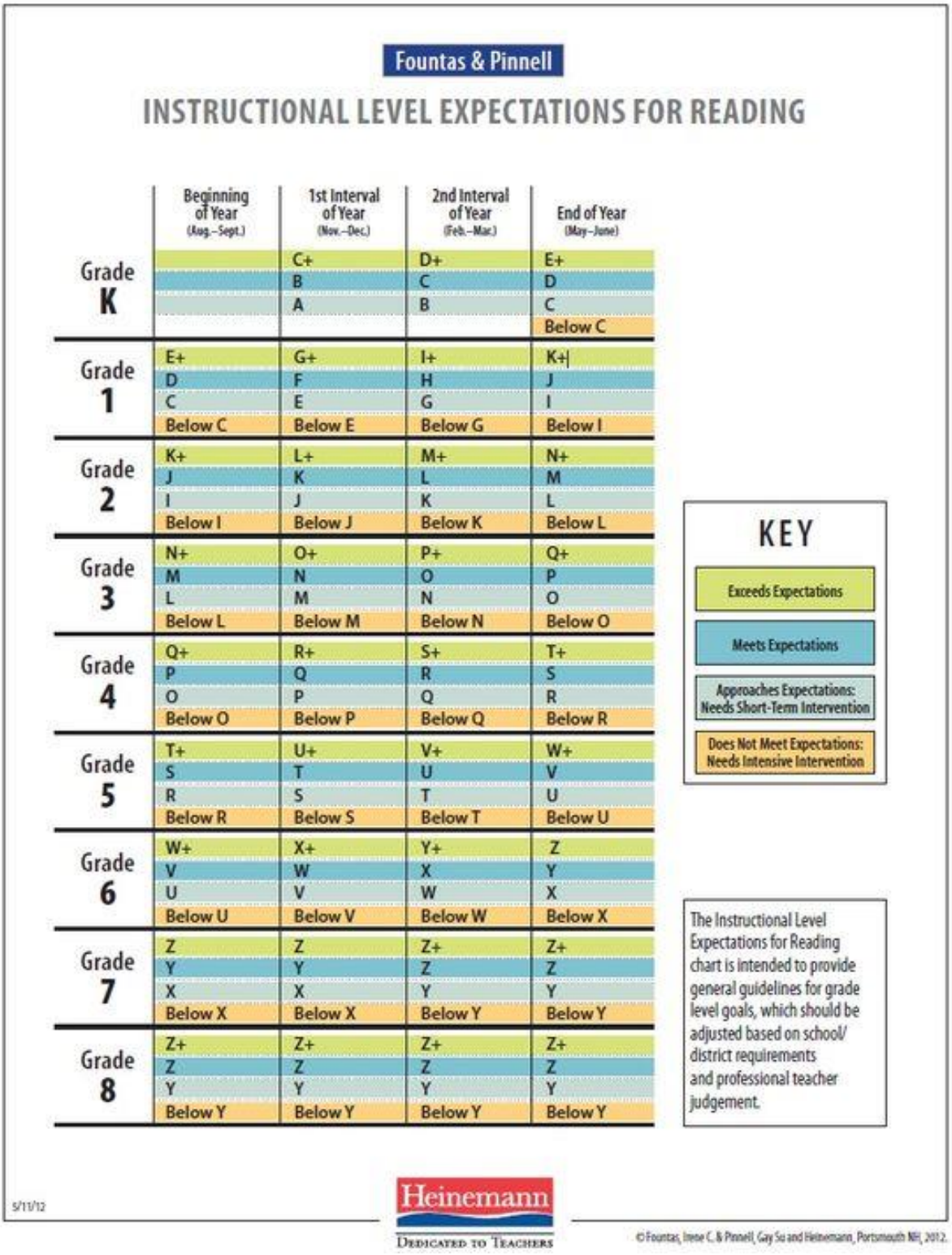
Appendix A: Instructional Level Expectations for Reading



Fountas & Pinnell

INSTRUCTIONAL LEVEL EXPECTATIONS FOR READING

	Beginning of Year (Aug.–Sept.)	1st Interval of Year (Nov.–Dec.)	2nd Interval of Year (Feb.–Mar.)	End of Year (May–June)
Grade K		C+	D+	E+
		B	C	D
		A	B	C
				Below C
Grade 1	E+	G+	I+	K+
	D	F	H	J
	C	E	G	I
	Below C	Below E	Below G	Below I
Grade 2	K+	L+	M+	N+
	J	K	L	M
	I	J	K	L
	Below I	Below J	Below K	Below L
Grade 3	N+	O+	P+	Q+
	M	N	O	P
	L	M	N	O
	Below L	Below M	Below N	Below O
Grade 4	Q+	R+	S+	T+
	P	Q	R	S
	O	P	Q	R
	Below O	Below P	Below Q	Below R
Grade 5	T+	U+	V+	W+
	S	T	U	V
	R	S	T	U
	Below R	Below S	Below T	Below U
Grade 6	W+	X+	Y+	Z
	V	W	X	Y
	U	V	W	X
	Below U	Below V	Below W	Below X
Grade 7	Z	Z	Z+	Z+
	Y	Y	Z	Z
	X	X	Y	Y
	Below X	Below X	Below Y	Below Y
Grade 8	Z+	Z+	Z+	Z+
	Z	Z	Z	Z
	Y	Y	Y	Y
	Below Y	Below Y	Below Y	Below Y

KEY

- Exceeds Expectations
- Meets Expectations
- Approaches Expectations: Needs Short-Term Intervention
- Does Not Meet Expectations: Needs Intensive Intervention

The Instructional Level Expectations for Reading chart is intended to provide general guidelines for grade level goals, which should be adjusted based on school/ district requirements and professional teacher judgement.

5/11/12

Heinemann
Dedicated to Teachers

Appendix B: Descriptive Data from SPSS

	1stQ1	1stQ2	1st Q3	1stQ4	2ndQ1	2ndQ2	2ndQ3	2ndQ4	3rdQ1	3rdQ2	3rdQ3	3rdQ4
Mean 0 PREK 0 FRL	2.61	2.75	2.72	2.61	2.71	2.99	3.05	3.09	3	3.15	2.97	2.78
N	74	76	78	79	78	77	78	79	78	78	78	79
SD	1.044	1.234	1.298	1.255	1.25	1.272	1.258	1.1	1.081	1.152	1.216	1.237
St. Error of Mean	0.121	0.142	0.147	0.141	0.141	0.145	0.142	0.124	0.122	0.13	0.138	0.139
Mean 0 PREK 1 FRL	1.8	1.74	1.75	1.69	1.8	1.98	2.12	2.19	2.15	2.25	2.1	2.02
N	193	198	208	216	210	210	214	216	206	216	215	216
SD	1.027	1.105	1.173	1.1	1.204	1.312	1.343	1.168	1.155	1.265	1.205	1.112
St. Error of Mean	0.074	0.078	0.081	0.075	0.083	0.091	0.092	0.079	0.08	0.086	0.082	0.076
Mean ALL 0 PREK	2.03	2.02	2.01	1.94	2.05	2.25	2.37	2.43	2.38	2.49	2.33	2.22
N	267	274	286	295	288	287	292	295	284	294	293	295
SD	1.091	1.227	1.281	1.212	1.279	1.374	1.382	1.215	1.196	1.298	1.267	1.194
St. Error of Mean	0.067	0.074	0.076	0.071	0.075	0.081	0.081	0.071	0.071	0.076	0.074	0.07

	1stQ1	1stQ2	1st Q3	1stQ4	2ndQ1	2ndQ2	2ndQ3	2ndQ4	3rdQ1	3rdQ2	3rdQ3	3rdQ4
Mean 1 PREK 0 FRL	2.43	2.44	2.51	2.36	2.5	2.83	2.93	2.86	2.93	3.01	2.89	2.65
N	178	179	179	179	179	179	179	179	179	178	179	179
SD	1.114	1.311	1.338	1.306	1.342	1.361	1.307	1.131	1.105	1.167	1.199	1.191
St. Error of Mean	0.084	0.098	0.1	0.098	0.1	0.102	0.098	0.085	0.083	0.087	0.09	0.089
Mean 1 PREK 1 FRL	1.72	1.63	1.63	1.59	1.68	1.88	2	2.09	2.13	2.1	2	1.86
N	249	252	253	254	249	250	254	253	248	253	253	253
SD	0.92	1.047	1.132	1.032	1.126	1.279	1.296	1.161	1.159	1.191	1.197	1.085
St. Error of Mean	0.058	0.066	0.071	0.065	0.071	0.081	0.081	0.073	0.074	0.075	0.075	0.068
Mean ALL 1 PREK	2.02	1.96	2	1.91	2.02	2.28	2.38	2.41	2.47	2.48	2.37	2.19
N	427	431	432	433	428	429	433	432	427	431	432	432
SD	1.064	1.229	1.294	1.212	1.286	1.393	1.378	1.208	1.203	1.261	1.273	1.195
St. Error of Mean	0.051	0.059	0.062	0.058	0.062	0.067	0.066	0.058	0.058	0.061	0.061	0.058

	1stQ1	1stQ2	1st Q3	1stQ4	2ndQ1	2ndQ2	2ndQ3	2ndQ4	3rdQ1	3rdQ2	3rdQ3	3rdQ4
Mean ALL PREK 0 FRL	2.48	2.53	2.57	2.44	2.56	2.88	2.96	2.93	2.95	3.05	2.91	2.69
N	252	255	257	258	257	256	257	258	257	256	257	258
SD	1.095	1.294	1.327	1.293	1.316	1.334	1.291	1.124	1.096	1.162	1.202	1.204
St. Error of Mean	0.069	0.081	0.083	0.08	0.082	0.083	0.081	0.07	0.068	0.073	0.075	0.075
Mean ALL FRL 0 PREK	1.76	1.68	1.69	1.64	1.74	1.93	2.05	2.14	2.14	2.17	2.05	1.93
N	442	450	461	470	459	460	468	469	454	469	468	469
SD	0.968	1.073	1.151	1.064	1.163	1.294	1.318	1.164	1.156	1.226	1.2	1.1
St. Error of Mean	0.046	0.051	0.054	0.049	0.054	0.06	0.061	0.054	0.054	0.057	0.055	0.051

Mean ALL FRL ALL PREK	2.02	1.98	2	1.92	2.03	2.27	2.38	2.42	2.43	2.48	2.35	2.2
N	694	705	718	728	716	716	725	727	711	725	725	727
SD	1.074	1.228	1.288	1.211	1.282	1.384	1.379	1.21	1.2	1.275	1.27	1.194
St. Error of Mean	0.041	0.046	0.048	0.045	0.048	0.052	0.051	0.045	0.045	0.047	0.047	0.044

Appendix C: Cross-Tabulation Data from SPSS

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
FGPro * PreK	728	99.9%	1	0.1%	729	100.0%
ThirdPro * PreK	727	99.7%	2	0.3%	729	100.0%

FGPro * PreK

Crosstab

			PreK		
			0	1	Total
FGPro	.00	Count	192	298	490
		Expected Count	198.6	291.4	490.0
		% within FGPro	39.2%	60.8%	100.0%
	1.00	Count	103	135	238
		Expected Count	96.4	141.6	238.0
		% within FGPro	43.3%	56.7%	100.0%
Total		Count	295	433	728
		Expected Count	295.0	433.0	728.0
		% within FGPro	40.5%	59.5%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.114[a]	1	.291		
Continuity Correction[b]	.950	1	.330		
Likelihood Ratio	1.110	1	.292		
Fisher's Exact Test				.297	.165
Linear-by-Linear Association	1.112	1	.292		

ThirdPro * PreK

Crosstab

			PreK		
			0	1	Total
ThirdPro	.00	Count	167	248	415
		Expected Count	168.4	246.6	415.0
		% within ThirdPro	40.2%	59.8%	100.0%
	1.00	Count	128	184	312
		Expected Count	126.6	185.4	312.0
		% within ThirdPro	41.0%	59.0%	100.0%
Total		Count	295	432	727
		Expected Count	295.0	432.0	727.0
		% within ThirdPro	40.6%	59.4%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.045[a]	1	.831		
Continuity Correction[b]	.019	1	.891		
Likelihood Ratio	.045	1	.831		
Fisher's Exact Test				.879	.445
Linear-by-Linear Association	.045	1	.831		
N of Valid Cases	727				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 126.60.

b. Computed only for a 2x2 table

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
FGPro * FRL	729	100.0%	0	0.0%	729	100.0%
ThirdPro * FRL	728	99.9%	1	0.1%	729	100.0%

FGPro * FRL

Crosstab

			FRL		
			0	1	Total
FGPro	.00	Count	130	361	491
		Expected Count	173.8	317.2	491.0
		% within FGPro	26.5%	73.5%	100.0%
	1.00	Count	128	110	238
		Expected Count	84.2	153.8	238.0
		% within FGPro	53.8%	46.2%	100.0%
Total		Count	258	471	729
		Expected Count	258.0	471.0	729.0
		% within FGPro	35.4%	64.6%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	52.267[a]	1	.000		
Continuity Correction[b]	51.080	1	.000		
Likelihood Ratio	51.302	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	52.195	1	.000		
N of Valid Cases	729				

ThirdPro * FRL

Crosstab

			FRL		
			0	1	Total
ThirdPro	.00	Count	100	316	416
		Expected Count	147.4	268.6	416.0
		% within ThirdPro	24.0%	76.0%	100.0%
	1.00	Count	158	154	312
		Expected Count	110.6	201.4	312.0
		% within ThirdPro	50.6%	49.4%	100.0%
Total		Count	258	470	728
		Expected Count	258.0	470.0	728.0
		% within ThirdPro	35.4%	64.6%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	55.145[a]	1	.000		
Continuity Correction[b]	53.989	1	.000		
Likelihood Ratio	55.243	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	55.070	1	.000		
N of Valid Cases	728				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 110.57.

b. Computed only for a 2x2 table

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
FGPro * LEP	729	100.0%	0	0.0%	729	100.0%
ThirdPro * LEP	728	99.9%	1	0.1%	729	100.0%

FGPro * LEP

Crosstab

			LEP		
			0	1	Total
FGPro	.00	Count	259	232	491
		Expected Count	313.2	177.8	491.0
		% within FGPro	52.7%	47.3%	100.0%
	1.00	Count	206	32	238
		Expected Count	151.8	86.2	238.0
		% within FGPro	86.6%	13.4%	100.0%
Total		Count	465	264	729
		Expected Count	465.0	264.0	729.0
		% within FGPro	63.8%	36.2%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	79.304[a]	1	.000		
Continuity Correction[b]	77.847	1	.000		
Likelihood Ratio	87.371	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	79.195	1	.000		
N of Valid Cases	729				

ThirdPro * LEP

Crosstab

			LEP		
			0	1	Total
ThirdPro	.00	Count	216	200	416
		Expected Count	265.7	150.3	416.0
		% within ThirdPro	51.9%	48.1%	100.0%
	1.00	Count	249	63	312
		Expected Count	199.3	112.7	312.0
		% within ThirdPro	79.8%	20.2%	100.0%
Total		Count	465	263	728
		Expected Count	465.0	263.0	728.0
		% within ThirdPro	63.9%	36.1%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	60.076[a]	1	.000		
Continuity Correction[b]	58.874	1	.000		
Likelihood Ratio	62.440	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	59.993	1	.000		
N of Valid Cases	728				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 112.71.

b. Computed only for a 2x2 table

Appendix D: Logistical Data from SPSS

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	854.456[a]	.174	.233

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Classification Table[a]

			Predicted		
			ThirdPro		Percentage
	Observed		.00	1.00	Correct
Step 1	ThirdPro	.00	294	121	70.8
		1.00	115	197	63.1
	Overall Percentage				67.5

a. The cut value is .500

Variables in the Equation

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	PreK(1)	.150	.171	.763	1	.382	1.161	.830	1.625
	FRL(1)	.710	.183	15.071	1	.000	2.033	1.421	2.909
	LEP(1)	.999	.190	27.562	1	.000	2.716	1.871	3.945
	IEP(1)	2.148	.366	34.541	1	.000	8.570	4.186	17.543
	Constant	-3.212	.387	68.958	1	.000	.040		

a. Variable(s) entered on step 1: PreK, FRL, LEP, IEP.

Appendix E: IRB Letter

The UNIVERSITY of OKLAHOMA

Institutional Review Board for the Protection of Human Subjects

Human Research Determination Review Outcome

Date: June 27, 2017

Principal Investigator: Paige Allison Lindemann

Study Title: An Examination of Reading Outcomes for an Early Childhood Program

Review Date: 06/27/2017

I have reviewed your submission of the Human Research Determination worksheet for the above-referenced study. I have determined this research does not meet the criteria for human subject's research. The proposed activity does not involve intervention or interaction with living individuals or the use of secondary data that consist of individually identifiable, private information. Therefore, IRB approval is not necessary so you may proceed with your project.

If you have questions about this notification or using iRIS, contact the HRPP office at (405) 325-8110 or irb@ou.edu. Thank you.

Cordially,

Fred Beard, Ph.D.
Vice Chair, Institutional Review Board